WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
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Bibliography: Texas wildlife

Anon. A short list of wildlife publications with special regard to Texas, Texas Game, Fish, and Oyster Commission (Austin) Bul. 14, 31 pp. Revised June 1939.

A classified and annotated bibliography, restricted to recent publications, and giving addresses and prices at which they may be obtained.

Classification: Ground squirrels

Davis, Wm. B. The Townsend ground squirrels of Idaho, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 182-190, 1 map, 1 table.

Distribution (mapped), relationships, characters, ecology, and records of occurrence of 4 subspecies of Citellus townsendii.

Classification: Grouse, Spruce

Uttal, Leonard J. Subspecies of the spruce grouse, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 460-464.

Realignment involving 4 subspecies, one of which, Canachites canadensis torridus (Gaspe Peninsula, New Brunswick, and Nova Scotia) is described as new. For each subspecies, synonymy, range, subspecific characters, and list of specimens are presented.

Classification: Pocket gophers

Goldman, E. A. Remarks on pocket gophers, with special reference to Thomomys talpoides, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 231-244.

General discussion of the group; list, with type localities, of 42 subspecies; and description of 9 new subspecies.

Classification: Snakes, Natrix

Clay, William M. A synopsis of the North American water snakes of the genus Natrix, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1938(4), December, pp. 173-182.

Key, synonymy, diagnoses, and statements of range for 10 species and 14 subspecies.

Classification: Snakes, Sonora

Stickel, William H. The snakes of the genus Sonora in the United States and Lower California, Copeia (M. Graham Netting, Carnegie Museum Pittsburgh, Pa. 75 cents a copy), 1938(4), December, pp. 182-190.

Key, synonymy, type localities, diagnoses, statements of range, and remarks for 6 species and 5 subspecies.

Conservation

Leopold, Aldo. A biotic view of land, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(9), Sept. 1939, pp. 727-730, 1 fig.

Conservation hitherto dominated by economics should become more ecologic. The biota as a whole is useful and should be so viewed, dropping prejudices as to details. The interactions of animals is illustrated by food chains and the interdependences of organisms and of the soil by the biotic pyramid. The effect of evolutionary processes has been to lengthen food chains and heighten the pyramid, while man by getting rid of larger predators has reduced both. Native animals and plants keep the energy circuit open; others may or may not. Exploitive use of the soil impairs the base of the biotic pyramid. Restoration may require return to the factors that originally built it. Violent interference with the biota should be abandoned in favor of more natural management. "Wild-raised game does not require hawk-less coverts." Preservation of associated wildlife seems necessary to successful forestry. Even in agriculture, modification has proceeded too far for the best interests of the farm. A good farm is one where the wild fauna and flora has lost acreage without losing its existence. Conservation on private lands is essential and ecology may supply the arguments necessary to make it a reality.

Conservation

Murphy, Robert Cushman. Conservation IV. Garden Club of America Bul. (598 Madison Ave., New York, N. Y.), 7(4), July 1939, pp. 42-56.

Chiefly on the amenities of Long Island, N. Y., as affected by occupation of the area by man. Comparison of the flora and fauna as reported in 1670 and as they are today. Comment on the extirpated forms. "It is evident, of course, that our culture could never have developed in an entirely primitive environment, but we realize now that both the extent and the rate of unnecessary exploitation have been appalling."

Careless introduction of alien organisms is mentioned with special reference to the starling. Greatest objection is to the consumption of tons of food formerly available to winter birds. "Few persons perhaps realize this particular objection to the starling and to certain other aliens. I believe that it is the weightiest point of all. Mathematically one might say that it changes a thousand native birds of ten species into a thousand alien birds all of one species. This result is obviously a very undesirable upsetting of the balances from every point of view." [A different point of view might be noted. Some believe that no introduced species can become established unless it finds a vacant ecological niche.] The article concludes with discussion of the wasting disease of eelgrass and its effects upon brant. The conservation outlook is discouraging in many ways but with sufficient effort past mistakes may in part be overcome.

Conservation: Condor

Sheldon, H. H. What price condor?, Field and Stream (515 Madison Ave., New York, N. Y. 15 cents a copy), 44(5), Sept. 1939, pp. 22-23, 61, 6 photos.

Author's peroration: "I am a naturalist and a conservationist, and believe the passing of any species to extinction would affect me with more regret than would assail the average, disinterested individual. But to set aside a sanctuary in the belief that the condor will continue to exist is to act without knowledge of the facts. In the first place, the bird could not exist in even the most extensive sanctuary unless someone killed his meat for him. And in the second place, by setting up such a sanctuary, man would be sacrificing the recreational value of a large area in exchange for the extremely doubtful preservation of a bird of no value, esthetically or otherwise." [This goes to show that there are conservationists of varying degree; evidently some do not consider the condor lacking in values, esthetic or otherwise, or present efforts to preserve the species would not be made. Deprecatory remarks, earlier in the article, upon the habits of the condor are uncalled for; carrion-feeders exist in all lands and no line can be drawn between incidental, occasional, and regular carrion-eaters. Many a "noble" bird of prey does not disdain carrion in a "pinch". The extirpation of large predators did not entirely do away with the condor's sources of food. There is always natural mortality, the victims of which among present large deer populations, for instance, will support a certain population of condors. Hunting always leaves some victims for scavengers and the cattle industry regularly writes off a significant percentage of inevitable losses. These provide grist for the condor's mill. In any event nothing is to be gained by giving up all hope of saving this species. It is spectacular and success in preserving it would have a value in impressing the public that might pay big dividends in some other case.]

Conservation: Farm

Leopold, Aldo. The farmer as a conservationist, American Forests (919 Seventeenth St., N.W., Washington, D. C., 35 cents a copy), 45(6), June 1939, pp. 295-299, 316, 323, 4 illus.

Depletion of fauna and flora is not inevitable; many more forms have been lost through indifference than of necessity. Awkward use rather than overuse often is responsible for disordering a resource. Conservation should keep resources in working order; it needs the positive exercise of skill and insight --environmental engineering. It is largely a job for the farmer and requires interspersion of land uses in which ecologic and esthetic as well as economic considerations shall be given weight. An interesting and useful essay. [Comment on the thought that cycles "are spreading both in geographic sweep and in number of species affected" is that whatever the merits of that claim may be for cycles as periodic occurrences, it should not be forgotten that the basic phenomena are fluctuations, which the evidence indicates are, and indefinitely have been, universal.]

Conservation: Missouri

Stephens, E. Sydney. Conservation Commission of Missouri (Jefferson City) Organization, Policies, Transactions, July 1937 to July 1, 1939, 75 pp., maps, graphs, tables. 1939.

Quotation of State constitutional amendment of November 1936, history of its adoption, and ratification by the courts. Fundamental tenets of the Commission and summary of its activities in administration, protection, land acquisition, restocking, farmer-sportsman cooperation, research, and extension.

Conservation: Santee-Cooper Project

Kauffmann, Erle. Conservation over the dam, American Forests (919 Seventeenth St., N.W., Washington, D. C. 35 cents a copy), 45(10), Oct. 1939, pp. 487-491, 510, 524, 1 map, 3 photos; 45(11), Nov. 1939, pp. 546-550, 560-561, 4 photos.

October. Analysis of arguments for and against the Santee-Cooper Project, S. C. Conservation aspects are indicated and slated for later discussion.

November. Probable effects of the undertaking upon the human population of the affected area, and upon forests and wildlife. Diversion of a great part of the flow of the Santee River will permit salt water to come upstream and change the ecology of a region now resorted to by large numbers of migratory waterfowl. What the ultimate result will be can now be only surmised but in part, at least, the effects will be unfavorable. Upland wildlife, including the purest strain of wild turkeys in the Southeast, also will be adversely affected. The Authority in charge of the work proposes, however, to establish game sanctuaries on any surplus lands it may acquire. The generally shallow reservoirs to be impounded, proponents expect to be eventually favorable for waterfowl. The project was disapproved in advance by the Federal conservation agencies concerned, but for good or ill it is, nevertheless, under way. Only time can reveal the net wisdom or unwisdom of the undertaking.

Control: Crawfishes

Gowanloch, James N. Controlling crayfish damage to lawns, Louisiana Conservation Review (Louisiana Dept. of Conservation, Civil Courts Bldg., New Orleans), Summer 1939, p. 39.

By doses of liquids put in burrows which are then tightly closed: (1) Tablespoonful of a 1 lb. to 3 gals. solution of chloride of lime, and (2) 2-3 drops of carbon bisulphide, to each burrow.

Control: Crawfishes

Lyle, Clay. The crawfishes of Mississippi, with special reference to the biology and control of destructive species, Iowa State College Journ. Science (Ames, Iowa. $1.00 a copy), 13(1), Oct. 1938, pp. 75-77.

Abstract of a doctoral thesis. Rarely if ever has WILDLIFE REVIEW presented an abstract of an abstract; however, this paper apparently has not been published in full and its control recommendations, especially, may be of use to some wildlife managers. History, economic importance, classification, and biology of Mississippi crawfishes, particularly Cambarus hageniamus, are briefly treated. The control section is here quoted in full:

"The best control is the application of poison to the burrows when the water level is only a few inches from the surface of the ground, or from January to May in most years. Pyrethrum, commercial creosote stock dips, coal tar creosote, orthodichlorobenzene, sodium cyanide, turpentine, ortho cresole, cresylic acid, miscible pine oil, nicotine, carbon bisulphide, phenothiazine, and calcium cyanamid were toxic in laboratory tests in the order named. Ineffective materials included the arsenicals, rotenone, picric acid, pyridine, resorcinol, thallium sulphate, and several others. Pyrethrum was ineffective at the temperatures in the burrows. The creosote stock dips are recommended on account of their low cost and ease of application. With infestations of 10,000 burrows per acre the cost of material is about 50 to 60 cents per acre. Where the stock dips are not available at low cost, home-made emulsions of turpentine and creosote are advised. Applications on small areas may be made with compressed air sprayers. On large plantations a double-acting force pump, mounted on a wagon and supplying several loads of hose, is very satisfactory. Splendid results have been secured on large-scale tests covering several hundred acres."

Control: Fish-eating birds

White, H. C. Bird control to increase the Margaree River salmon, Fisheries Research Board of Canada Bul. 58 (Ottawa. 20 cents a copy), 30 pp., 15 figs., 1939.

More salmon were desired by anglers who variously blamed the shortage on commercial fishing at the river's mouth, poaching, climatic conditions, and natural enemies. (See Bul. 57 of the same organization.) Fish predators were studied by stomach and pellet analyses and by other means. Eight kinds of birds, 3 of fishes, and 2 of mammals are commented on. The last are considered insignificant but kingfishers and mergansers are estimated to consume 880,000 young salmon in a season. Experimental bird control for one year on a tributary of the Margaree River was followed by an increase of 121 percent in salmon smolts. The methods of control were shooting kingfishers and destroying their eggs, and shooting mergansers and trapping them in nets. The author does not urge general control, saying "Even though bird control increases the salmon of the Margaree, it does not follow that such control is desirable for all salmon streams. x x x The results indicate that these birds have a significant effect, but it is not claimed that there has been any proof either that in general they have a significant effect or that the best method of protecting young salmon is to eliminate birds from salmon streams."

[Comment: These are the saving words of a scientific investigator. Anglers and guides cannot be expected to approve them. It seems too bad that the entire game-keeper complex could not have been left behind with other undesirable elements of the old world. Sport is non-essential and it is not in the public interest to permit persecution of every living thing that seems to interfere with it.]

Control: Grouse predators

Edminster, Frank C. The effect of predator control on ruffed grouse populations in New York, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 345-352, 5 tables.

Author's abstract: "Experiments in southern New York covered 'complete' control, i.e. all predatory birds and mammals, and 'selective' control of foxes and weasels. Conducted over a period of five years with the grouse (Bonasa umbellus), populations were determined on the controlled areas and on check, i.e. no predator control, areas. Increased fall populations of grouse obtained on the controlled areas in years of increasing abundance, but there was no increase in years of peak abundance. Practicability of measures doubtful."

Control: Household animals

Gibson, Arthur, and C. R. Twinn. Household insects and their control, Dominion of Canada Dept. of Agr. Publ. 642 (Farmers' Bul. 71. Minister of Agriculture, Ottawa, Canada. 25 cents a copy), 100 pp., 101 figs. Third printing, June 1939.

Refers also to the brown rat; house, deer, field, and red-backed mice; shrews; squirrels; bats; weasels; house sparrow; and barn and cliff swallows. Some of these, not in need of control, are, nevertheless, the subject of correspondence from ill-informed complainants.

Control: Pocket gopher

Parton, H. L. Controlling pocket gophers, University of Minnesota (Minneapolis) Agr. Ext. Div. Extension Folder 75, 6 pp., 5 figs., June 1939.

Habits of the animals briefly described; control suggestions relate to finding main runways, and making and placing baits.

Control: Range animals

Stewart, George, R. H. Walker, and Raymond Price. Reseeding range lands of the intermountain region, U. S. Dept. of Agriculture Farmers' Bul. 1823 (Supt. of Documents, Washington, D. C. 5 cents a copy), 25 pp., 11 figs., 2 tables, July (August) 1939.

Upon the restoration of 5,000,000 acres of abandoned cropland, largely former dry farms, and 7,000,000 acres of overgrazed lands, depends the future of the livestock industry in the Intermountain region. Reseeding of the better soils is practicable but control of certain animals is necessary. "A heavy infestation of rodents will require the use of some measure of control to save new plantings. Where big game is especially abundant, high fences for protection against deer may need to be provided." The authors are even more emphatic about protection from grazing. "Grazing control is essential to the success of the reseeding project. x x x Most critical areas should be well fenced x x x

All the noteworthy successes x x x were achieved on land where livestock grazing was under control. Lack of livestock control brought many failures, even where other conditions were favorable."

Control: Rat, Australia

McDougall, W. A. Notes on rat baits, rat poisons, and rat population, Cane Growers' Quarterly Bul. (Bureau of Sugar Experiment Stas., Brisbane, Queensland, Australia), 6(2), Oct. 1938, pp. 36-38.

Results announced in this paper may be of interest in the United States although the rat (Rattus culmorum) chiefly dealt with is a different species from those occurring here. Baits in the order of their utility, beginning with the best, are: Rolled oats, cracked corn, whole corn, wheat meal, whole wheat, barley, and bread. Adding linseed or corn oil increases attractiveness but not palatability. No appetizer will increase the intake of a poor bait. As to poisons, red squill, arsenic, zinc phosphide, and barium carbonate were unsatisfactory. All of these as well as strychnine and yellow phosphorus tended to reduce bait intake. Phosphorus is the most deadly of the poisons tested and thallous sulphate the most reliable.

A population of even-sized rats is more easily controlled than one of mixed ages. Thus rapidly reproducing "plague" populations are harder to deal with than "normal" ones. General continuous control may not be economically sound but control might best be applied where there is obvious damage.

Much the same account is given on page 43 of the 38th Ann. Rep. Queensland Bur. of Sugar Exp. Stas. (Brisbane), 1938.

Cycles

Speirs, J. Murray. Fluctuations in numbers of birds in the Toronto region, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 411-419, 1 fig., tables.

Author's summary: "Some of the species of birds that have wintered in the Toronto region have fluctuated markedly in numbers from year to year. The peak years for any one of those species have tended to be separated by definite intervals, but variations from this average interval have occurred which have probably been distributed about the average value according to the probability curve. The peaks of abundance of the American Rough-legged Hawk, the Snowy Owl and the Northern Shrike have usually occurred at intervals of from three to five years, while peaks of the Pine Grosbeak have occurred at intervals of five or six years, and peaks of the Goshawk and Horned Owl have occurred at intervals of from nine to eleven years. The peaks have occurred in the years immediately following the maximum abundance of their food in the North. No evidence has been detected to suggest that lack of food drove the birds south."

Bibliography of 15 titles.

Destruction: Blackbirds

Odum, Eugene P., and Frank A. Pitelka. Storm mortality in a winter starling roost, Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 451-455, 1 fig., tables.

Urbana, Ill. Authors' summary: "(1) A 'blackbird' roost was subjected to a driving wind and rain storm from relatively unprotected southwest and west sides; (2) the wind reached a maximum velocity of 48 miles per hour and was followed by a sharp drop in temperature and continued high wind; (3) the destructive combination of weather conditions occurred when a warm southeast wind suddenly shifted to the southwest and west; (4) a mortality of approximately 4% resulted in the 'blackbird' roost, the size of which was estimated at 25,000 birds; (5) a differential mortality among the species of the roost was apparent; the proportion of Grackles and Cowbirds to Starlings in the total mortality was considerably greater than that in the total roosting flock."

Destruction: By floods

Blair, W. Frank. Some observed effects of stream-valley flooding on mammalian populations in eastern Oklahoma, Journ. Mammalogy (Jm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 304-306.

Relates mainly to small mammals as mice, shrews, and moles. The observations "indicate that severe flooding in years of abnormally heavy rainfall affects adversely the populations of small, terrestrial mammals inhabiting flood-plains in eastern Oklahoma. In the case of some wholly terrestrial species that are confined to flood-plain associations such flooding probably produces virtual extermination of these species in some parts of their ranges. The fact that the mole was found, without exception, in all of the flooded areas probably indicates that this species was quite successful in escaping the floodwaters and that it reoccupied the flood-plain after the water had subsided."

Destruction: Sea-lions

Abbott, Clinton G. Sea-lion slaughter, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 41(5), Sept.-Oct. 1939, pp. 265-270, 3 photos.

Warfare of fishermen upon sea-lions, though from time to time interrupted, seems ever to spring up anew. A great many males were slaughtered for their genitalia, the basis of a medicine deemed restorative by the Chinese; present economic conditions have resulted in cessation of this inexcusable destruction. Now killing the animals for manufacture of dog food arises as a greater menace than any of the past. It is carried on in Mexico but conservationists have had to fight off efforts to remove protection from the animals in California. Eternal vigilance is necessary for conservation of the animals.

Destruction: Vanishing species

Scott, W. E. Rare and extinct mammals of Wisconsin, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(10), Oct. 1939, pp. 21-28, 5 photos.

Notes on 5 extinct, one reintroduced but dwindling, and 3 rare species; briefer mention of a few other uncommon forms.

Diseases and Parasites: Animal borne diseases

Wolf, William. Animals bring us diseases, Scientific American (24 West 40th St., New York, N. Y. 35 cents a copy), 160(5), May 1939, pp. 282-284, 4 photos.

Popular account of vertebrate borne diseases of which those carried by American wildlife are: Rocky Mountain spotted fever, plague, and tularemia.

Diseases and Parasites: Blood parasites

Huff, Clay G. A survey of the blood parasites of birds caught for banding purposes, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), N.S. 47(6), June 1939, pp. 615-620, 1 fig., 3 tables.

Parasites found in blood smears contributed by bird banders. Positive findings are reported for 32 species and negative for 49. Occurrence of 4 genera of parasites, and of the species of one of them (Plasmodium) in birds by systematic groups is tabulated. A second table shows the results obtained from individual birds examined two or more times, and a third, infections in immature birds. Bibliography of 11 titles.

Diseases and Parasites: Echinococcus

Riley, William A. Maintenance of Echinococcus in the United States, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 95(449), Aug. 1939, pp. 170-172.

Written with special reference to occurrence of this parasite in domesticated animals, the article includes also records for the moose, white-tailed deer, and timber-wolf among native mammals. Bibliography of 16 titles.

Diseases and Parasites: Eelgrass

Cottam, Clarence. The eelgrass situation on the American Pacific coast, Rhodora (Ludlow Griscom, M. C. Z., Cambridge, Mass. 20 cents a copy), 41(487), July 1939, pp. 257-260.

Although Labyrinthula, postulated by some as the cause of the wasting disease, has been identified in eelgrass from Departure Bay, B. C., inspections and reports representing a number of localities from Alaska to California do not

indicate any reduction of the plant along the Pacific coast. In European waters and on the American Atlantic coast improvement continues. In the succeeding article, "Environmental factors and the wasting disease of eelgrass" (pp. 260-262, 2 tables), Neil E. Stevens discusses the causes that have been predicated for the malady and says that further study is needed. He gives a bibliography of 6 titles.

Diseases and Parasites: Encephalomyelitis

Gwatkin, Ronald. On the susceptibility of ground squirrels to the virus of equine encephalomyelitis and ticks as possible vectors, Canadian Journ. Comparative Medicine (Gardenvale, Quebec, Canada), 3(5), May 1939, pp. 131-133, 2 tables.

Citellus richardsoni. Experimentally it was demonstrated that these animals are susceptible to the disease, and that ticks infesting them can carry enough of the virus to kill a guinea pig.

Diseases and Parasites: Fibroma

Honess, Ralph F. A freak deer head, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, p. 360, 2 pls.

Author's abstract: "Large multiple fibroma on head and neck."

Diseases and Parasites: Lead poisoning

Anon. New bird shot proposed to stop duck poisoning, Science News Letter (2101 Constitution Ave., N.W., Washington, D. C. 15 cents a copy), Sept. 2, 1939, p. 152.

Notice of a patent granted to R. L. Dowdell and R. G. Green of the University of Minnesota for a readily disintegrable shot, use of which would in time do away with the menace of lead poisoning to waterfowl. The proposed shot would consist of an alloy of lead with magnesium, barium, zinc, calcium, or sodium. To avoid disintegration in birds placed in cold storage, a thin coating of some other metal like copper or cadmium could be applied. The new shot is not commercially available.

Diseases and Parasites: Lead poisoning

Jones, John C. On the occurrence of lead shot in stomachs of North American Gruiformes, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 353-357, 2 tables.

Author's abstract: "A brief survey of literature on lead poisoning is followed by a report on the occurrence of lead shot in 1,977 stomachs of North American members of the Order Gruiformes. Two tables are given showing: occurrences, by months, of lead shot in the different species; and numbers of

pellets found in individual birds. Cranes, limpkins, and king, clapper, and Virginia rails were relatively unaffected and gallinules only slightly so, while soras and coots supplied most of the occurrences. Nearly half of the records came from soras, this species being apparently the only one to which lead shot represents a potential menace. Lead shot occurrence is far more prevalent in ducks, as shots were found in only 2.5 percent of all rail stomachs, while in ducks, records ranged from 9.5 for all species to as high as 75.5 percent for a single species."

Diseases and Parasites: Nematodes, frog

Wehr, Everett E., and O. R. Causey. Two new nematodes (Filaroidea: Dipetalonematidae) from Rana sphenocephala, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 a section), 30(2), Sept. 1939, pp. 65-68, 6 figs.

Foleyella brachyoptera and F. dolichoptera from Florida described as new; key to 4 N. A. species of the genus.

Diseases and Parasites: Plague

Eskey, C. R. Recent developments in our knowledge of plague transmission, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 53(2), Jan. 1938, pp. 49-57.

Relative efficiency of various species of fleas as vectors; incidental mention of their hosts, including some wild rodents.

Diseases and Parasites: Plague

Eskey, C. R., and V. H. Haas. Plague in the western part of the United States, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 54(32), Aug. 11, 1939, pp. 1467-1481, tables.

Subtitle "Infection in rodents, experimental transmission by fleas, and inoculation tests for infection." Plague was first discovered among ground squirrels near San Francisco in 1900. It is now known in wild rodents of 9 western States, including localities east of the continental divide but not as yet in the Great Plains. Ground squirrels, prairie dogs, marmots, chipmunks, tree squirrels, wood rats, kangaroo rats, native mice, and rabbits are known to have been infected. Practically all of the fleas found on these animals are capable of transmitting plague. The species of fleas are named, their laboratory record as vectors tabulated, and other facts given as to their incubation and transmission of plague infection. Inoculation of guinea-pigs with the bodies of fleas collected from rodents is preferable to depending upon the discovery of plague-infected animals as a means for determining the existence of foci of infection. A footnote announces that the present paper is a resume of a comprehensive detailed report that is to be published as a Public Health Bulletin.

Diseases and Parasites: Plasmodium

Wetmore, Psyche M. A species of plasmodium from the sharp-tailed grouse infective to other birds, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 361-365, 1 pl., 2 tables.

Author's abstract: "Five canaries, three bob-whites, and two grouse were infected with a plasmodium isolated from Pediocoetes phasianellus campestris. This plasmodium produces 4 to 12 merozoites, displaces the cell nucleus of the natural host slightly when fully mature, and appears to have relatively little pathogenicity. A table of comparisons is given of this species with 4 others currently recognized as valid."

Diseases and Parasites: Rodent borne diseases

Gibbons, R. J. Survey of Rocky Mountain spotted fever and sylvatic plague in western Canada during 1938, Canadian Public Health Journ. (105 Bond St., Toronto 2, Canada. 35 cents a copy), 30(4), April 1939, pp. 184-187, 2 tables.

Examination of large numbers of specimens of both rodents and fleas collected in Alberta and British Columbia revealed no trace of the diseases mentioned. Several ticks were found to be infected with Bacillus tularense, the cause of tularemia in man.

Diseases and Parasites: Ticks

Cooley, R. A., and Glen M. Kohls. Ixodes marmotae. A new species of tick from marmots (Acarina: Ixodidae), U. S. Public Health Reports, 53(49), Dec. 1938, pp. 2174-2181, figs. (Separately published as Reprint 2011, 8 pp., figs., 1939. Supt. of Documents, Washington, D. C. 5 cents a copy.)

Segregation of the western counterpart of I. cookei; description, illustrations; type locality Idaho. Both forms attack man.

Diseases and Parasites: Tularemia

Francis, Edward. Sources of infection and seasonal incidence of tularaemia in man, U. S. Public Health Reports, 52(4), Jan. 1937, pp. 103-113. Reprint 1799 (Supt. of Documents, Washington, D. C. 5 cents a copy), 10 pp., 6 photos, 2 maps, 2 tables.

The history of tularemia is briefly stated, and its distribution described and mapped. The number of cases reported up to 1935, inclusive, is tabulated by years; the total was 6,174, deaths 299, mortality rate 4.8 percent. Wild rabbits and hares, tree squirrels, and about 10 other groups of wild mammals and birds, and one snake have been implicated in cases of the disease in man. More than 90 percent of the human cases come in one way or another from wild rabbits. In the Northeast a good many of the cases trace to rabbits

shipped from the west. Lesions in rabbits and man are described and illustrated. Symptoms in man, diagnosis, and prevention are discussed. Survival of an attack appears to confer permanent immunity.

Ecology: Carrying capacity.

Grimm, Rudolf L. Northern Yellowstone winter range studies, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 295-306, 4 pls., tables.

Author's abstract: "Using protected and unprotected range chart plots in Yellowstone National Park, it was learned that 72.2% of the loss in plant density over a seven-year period was due to drouth and 27.8% to overgrazing. Sagebrush utilization plots in which one-half of the annual growth of each plant was clipped during October and the other half the following April showed that 28.5% of the annual growth of sagebrush (Artemisia tridentata) was utilized where the game population consisted chiefly of elks and that this utilization on areas stocked heavily with antelopes and deer as well as elks amounted to 81.3%, or nearly complete consumption of the annual growth. A range survey showed that 65% of this species of sagebrush had died primarily because of excessive utilization. Protected and unprotected plots of aspen, each 20 feet square, were charted over a period of 4 years in the case of two plots and for 3 years in that of another, and it was found that there was a 9.3% increase in the number of aspens in the protected, and of 42.7% in the unprotected, plots. The extent of the range available to the game animals during the winter periods, varying with the depth of snow, was mapped monthly over a 4-year period and the average number of forage acres available to the animals calculated. It was determined that the northern Yellowstone winter game range can support 7,334 elksin addition to the antelopes, deer, bighorn sheep, and buffaloes that also use it."

Ecology: Census methods, dove

McClure, H. Elliott. Cooing activity and censusing of the mourning dove, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct, 1939, pp. 323-328, tables.

Author's abstract: "Cooing activity of mourning doves (Zenaidura macroura) at Lewis, Iowa, from March 26 to September 17, 1938, was recorded in 2,254 observations. Observations were made for five minutes at the end of each hour of the day. During this time the doves cooed an average of 20.4 times, 1.8 birds cooed, and there were 11.2 coos to a bird. Cooing was greatest in the early morning, least at midday, and increased again in the evening before sundown. Temperatures except below freezing and above 25° C. had little effect on cooing, but it decreased with increased cloudiness and wind speed. Cooing activity each day was nearly uniform from April through August. Using this information it is possible to census the doves in an area and a method and tables for doing it are given."

Ecology: Cover

Elton, Charles. On the nature of cover, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 332-338.

Author's abstract: "The great importance of cover in the protection and restoration of wildlife resources justifies greater attention to its place in the general protective system of the prey. Cover helps in protection not only from predators, but also from physical effects of weather, and from disturbance during mating activities. It may also in itself provide food. Analysis of the process of searching by a predator for its prey shows three main phases, in all of which cover is, or may be, important: (1) Random searching, in which the predator and prey are not in sensory contact, (2) pursuit, and (3) refuge. Owing to the variable part played by cover itself in these phases, it is more profitable to study the protective system of the prey as a whole. This includes: (1) The physical qualities and behavior of the prey, (2) of the predator, and (3) the qualities of the environment (vegetative and other cover, topography, surface conditions, state of atmosphere, night or day, and associated animals). These concepts are applicable also to the ecology of man, both as regards sport and war. The best method of measuring the effects of cover is by means of population counts and observations of the rate of contact established between the predator and its prey."

Ecology: Drainage operations

Anon. Needed--same program of ecology, Louisiana Conservation Review (Louisiana Dept. of Conservation, Civil Courts Bldg., New Orleans), Summer 1939, pp. 7, 58, 1 photo.

Undesirable effects of drainage of wildlife habitat illustrated by quotations relating to the Kankakee marsh, Indiana. Louisiana, while faced with the necessity of draining certain areas, should seek "a same middle course which will give x x x the benefits of reclamation and mosquito control and at the same time conserve the natural resources which are such a rich heritage for our people."

Ecology: Low temperatures vs. cottontails

Gerstell, Richard. The value of groundhog holes as winter retreats for rabbits, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, Pa. 10 cents a copy), 10(6), Sept. 1939, pp. 6-9, 6 figs., 3 tables.

A combined field and laboratory study which indicates that marmot burrows provide cottontails with dry, windless, even-temperatured retreats which admirably protect the rabbits from weather. Cottontails have less resistance to cold than do pheasants and it is believed that groundhog holes are highly beneficial to the bunnies.

Ecology: Populations, bird

Hickey, Joseph J. [Editor]. Bird-Lore's third breeding-bird census, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 41(5), Sept.-Oct. 1939, Supplement, pp. 13-31.

Thirty-two reports mostly from the middle west, covering 4 types of environment: (1) Bogs and marshes; (2) fields; (3) woodlands; and (4) man-made surroundings. The reports describe the areas concerned, indicate the degree of coverage, and present and discuss the censuses. The work seems of high grade throughout; it was participated in by some well known in the fields of ecology and wildlife management as well as in that of ornithology.

Education: Conservation

Palmer, E. Laurence. Conservation education in the schools, Nature Magazine (1214 Sixteenth St., N.W., Washington, D. C. 35 cents a copy), 32(9), Nov. 1939, pp. 509-516, 2 photos.

This second report on a study of conservation education carried on in cooperation between the American Nature Association and Cornell University begins by citing 6 publications that have already resulted from the investigation. The article then reviews legislative and other effort at conservation education in the States and refers to printed contributions to the subject. Suggestions are made as to the types of instruction suitable for the various grades of the public schools and as to organization of conservation materials for school use. The latter topic is treated in four ways with reference to systematic and ecologic groups, to man's interests, and to scientific principles. There is a bibliography including general reference materials, and publications useful in elementary, secondary, and collegiate schools.

Education: Conservation

Weaver, Richard Lee. Recent trends in conservation education, School Science and Mathematics (Central Assoc. of Science & Mathematics Teachers, Inc., 450 Ahmaip St., Menasha, Wis.' 55 cents a copy), 38(6), June 1938, pp. 647-655.

The depression has hurt conservation education as this subject was one of the first to be affected by retrenchment in expenditures. A great deal of work was necessary to bring it to the point once achieved and further effort will be required to restore and extend it. Game birds and mammals receive many times more consideration than non-game species and wild flowers. Can that situation be changed and how? Propaganda thrives far more than true education. Michigan has a well organized division of education and Florida, Wisconsin, and Oklahoma have passed laws requiring conservation education in public schools. One effort to get Federal legislation in this field has been defeated. Something along the line of the Smith-Hughes Act in support of vocational training, however, should be feasible. Adequate teacher training is a great need of the movement and lack of it may bring failure even where a promising beginning has been made. Cornell University is making a survey of the present status of conservation education with a view to aiding in its improvement.

Education: Conservation

Weaver, Richard Lee. Conservation education in some Federal and national agencies of the United States, Cornell University (Ithaca, N. Y.) abstracts of theses, 1939, pp. 116-120.

Part of the results of a study of conservation education; summary of activities of the Biological Survey, Extension Service, Forest Service, Soil Conservation Service, National Park Service, Office of Education, Civilian Conservation Corps, and national youth organizations. Author's conclusion: "Conservation education has been recognized as an essential part of most of the Federal and National programs. It is probably the strongest in the National Park Service, Extension Service, Soil Conservation Service, Forest Service, and Camp Fire Girls, Inc. It seems to need strengthening in the Office of Education, Civilian Conservation Corps, Boy Scouts of America, and Girl Scouts, Inc. Conservation education could be greatly facilitated in all the agencies by additional appropriations designed specifically for that purpose."

Education: 4-H clubs

Kottunen, A. G. How youth is learning to practice conservation, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(12), Aug.-Sept. 1939, pp. 3-4, 2 photos.

4-H Club activities, in forestry, soil conservation, pheasant propagation and management, door-yard study, and individual projects relating to wildlife. Needs of the program are discussed. Associated notices in the same journal describe a conservation encampment, report on pheasant raising by "hundreds" of youths, propagation of raccoons, establishment and improvement of a waterfowl sanctuary, making shelters for birds, and other 4-H Club doings.

Food Habits: Algae eaten by waterfowl

Lynch, John J. Marine algae in food of Rhode Island waterfowl, Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 374-380, 2 tables.

Marine algae are taken freely by the baldpate and black duck and to a lesser extent by the greater scaup. Algae are emergency foods and appear to be partially indigestible; specific identifications are given. Bibliography of 6 titles.

Food Habits: Bear, Black

Cottam, Clarence, A. L. Nelson, and Talbott E. Clarke. Notes on early winter food habits of the black bear in George Washington National Forest, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 310-314, 2 tables.

In mountainous sections of Virginia, the black bear persisted under hunting better than the white-tailed deer. Bears are reasonably numerous on the Forest named and there seems to be no reason why they cannot be perpetuated. Weights are given for two specimens (♀ 225 and ♂ 325 lbs.) and volume of stomach

contents for a like number (544 and 730 cc.). Twenty-five analyses are reported. With the exception of rabbit remains in 2 stomachs and a little other animal food amounting to less than 1 percent of the stomach contents in which they occurred, all of the food was vegetable. Acorns, and fruits of blueberry, grape, and tupelo are leading items.

Food Habits: Bud eating

Fryer, J. C. F. The destruction of buds of trees and shrubs by birds, British Birds (326 High Holborn, London, England. 1 shilling and 9 pence a copy), 33(4) Sept. 1939, pp. 90-94, Pl. 2.

Report on a restricted and carefully conducted questionary. Difficulty in making satisfactory observations was experienced possibly due to much of the bud eating being done at daybreak. Five species of birds are definitely implicated. From author's conclusion: "Apart from the Bullfinch and House-sparrow, the part played by the different species of bird in bud destruction is still undecided, and requires further investigation. The subject, however, is not easily dealt with, and the study is not without pitfalls, so that it is hardly appropriate to those who can only give it but casual attention."

Food Habits: Coyote

Hawbecker, Albert C. Coyotes prey on goats, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 371-372.

Definite records of 55, 76, and 317 goats being killed on ranches in Santa Cruz County, California, within a period of 2 years. A crippled and hence trap shy coyote never returned to a carcass but killed anew each time. Belled goats appear to be protected.

Food Habits: Coyote

Sperry, Charles C. Food habits of peg-leg coyotes, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 190-194, 2 figs.

Comparison of food habits as disclosed by analyses of 8,263 stomachs of normal, and 161 of trap crippled, coyotes. The latter animals feed more extensively upon carrion and livestock and are potentially and possibly actually a greater menace to domestic animals especially sheep and goats than are normal animals.

Food Habits: Deer damage

Anon. Michigan's deer damage problem, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(2), Nov. 1939, pp. 6, 7, 4 photos.

Has been increasing and this year was intensified by early frosts stopping wild growth and forcing the deer back onto alfalfa, corn, and garden produce. Deer cropping increases the extent of winter killing of alfalfa. A committee representing sporting and agricultural interests studied the situation and recommended the issuing of permits to kill deer in limited numbers where necessary to protect crops, and experimentation with fences, noise makers, repellents, and food patches as means of preventing or reducing damage. For the future, zoning and planning were recommended, which will operate to segregate chiefly recreational, from chiefly agricultural, areas.

Food Habits: Fish-eating birds

Cottam, Clarence, and C. S. Williams. Food and habits of some birds nesting on islands in Great Salt Lake, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 150-155.

Life history notes, and report on field observations and stomach and pellet analyses for the California gull, white pelican, great blue heron, and golden eagle. From authors' summary: "While fish-eating birds normally have rapid digestion, their nesting on islands 30 to 100 miles removed from their source of food supply suggests that they may have some mechanism for controlling the digestive organs and possibly also the rate of digestion. Young birds of Gunnison and Hat Islands that had just been fed by their parents were seen to regurgitate quantities of practically undigested food. The gulls seemed to be both scavengers and omnivorous feeders and disgorged undigested grasshoppers, garbage and fish, while pelicans seemed to be subsisting entirely upon non-game fish. Pellets and stomachs of herons showed that these birds had fed on ground squirrels, field mice, fish, young birds, insects, and plant fiber, while two large Golden Eagle pellets showed only the remains of muskrat." Bibliography of 7 titles.

Food Habits: Foxes

Chaddock, T. T. Report on grey and red fox stomach examinations, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(9), Sept. 1939, pp. 53-54.

Number of stomachs reported upon: Red fox 20; gray 113. Chief food in each case rabbits. Other items and the percentages of their occurrence listed.

Food Habits: Foxes

Hatfield, Donald M. Winter food habits of foxes in Minnesota, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 202-206, 2 tables.

Report on analyses of the stomach contents of 53 gray and 34 red foxes. Rabbits and mice were the predominant foods. Poultry and game birds were taken in larger proportion by the red than by the gray fox: 14:11.3 percent. All food items are tabulated and discussed. Popular claims as to great destruction of game birds are not substantiated.

Food Habits: Hawk, Marsh

Randall, Pierce E. Fall and winter food habits of the marsh hawk, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(7), Oct. 1939, pp. 12, 29, 4 tables.

Information obtained by analysis of pellets collected on an area in Lehigh County, Pa., where management studies of the ring-necked pheasant are in progress. The findings are tabulated for 4 seasons, early fall, late fall, winter, and periods of deep snow. In each, mice were the leading, and birds the second-ranking, article of diet; average percentage of occurrence, 78.7 and 13.6, respectively. No game birds were taken.

Food Habits: Pheasant, Amur

Loukashkin, A. S. The Amur ringed pheasant. An investigation into its natural food, The Field (Broom's Bldgs., London, E. C. 4, England. 1 shilling a copy), 173(4510), June 3, 1939, p. 1288, 2 photos.

This subspecies, Phasianus colchicus pallasi, of northern Manchuria lives mainly in dense cover of hazel bushes and scrub oak which plants also are its principal sources of food. Fruits of Vaccinium, Crataegus, Malus, and Viburnum, bulbs of Lilium, and seeds of legumes and grasses also are important. Insects and turtle eggs are prominent in the animal food. The bird lives also in cultivated districts where farm grains are much depended upon.

Food Habits: Poisonous plants

Thompson, Dave. Is there poison in your pasture?, The Prairie Farmer (1230 Washington Blvd., Chicago, Ill.), 111(16), Aug. 12, 1939, pp. 8, 21, 9 photos, 5 cartoons.

Descriptive notes and illustrations of 9 poisonous plants; also means of control and symptoms caused by eating them. Some are plants wildlife managers may use as black locust, wild cherry, and pokeweed.

Food Habits: Prairie dog

Kelso, Leon H. Food habits of prairie dogs, U. S. Dept. of Agriculture Circ. 529 (Supt. of Documents, Washington, D. C. 5 cents a copy), 15 pp., 4 tables, June (Sept.) 1939.

Review of literature (11 titles of which are cited) on the systematic and economic status of prairie dogs. Reports on analyses of 247 stomachs of the black-tailed, 169 of the white-tailed, and 127 of Gunnison, prairie dogs. The average food is almost entirely vegetable (97.47 percent) and consists largely of grasses, saltbushes, and other plants of value as forage for livestock. Other vegetation eaten includes weeds and certain plants poisonous to cattle. The animal matter taken consisted mostly of cutworms and grasshoppers. [The extent to which identifications were carried in these difficult analyses is gratifying, undetermined herbage averaging less than 2 percent for the 3 species.]

Food Habits: Rabbit, European

Madson, Holger. Does the rabbit chew the cud?, Nature (St. Martin's St., London, W. C. 2, England. 1 shilling a copy), 143(3632), June 10, 1939, pp. 981-982.

Morot in 1882 noted that the rabbit produces two sorts of feces, the first during the night--soft, mucous; the second during the day--pellet-like. The night feces are taken directly from the anus and swallowed by the animal, and Morot attributed the difference in consistency of the two sorts of feces to the food having passed once or twice through the alimentary canal. References are given to the original and 4 related papers. The author of the contribution here abstracted concludes from experiments that the phenomenon is due to an intestinal rhythm, but he emphasizes that rabbits are commonly known to be coprophagous. In discussion (pp. 982-983), E. L. Taylor confirms the regular occurrence of food pellets in rabbit stomachs and states that he has experimentally verified habitual coprophagy.

[The European rabbit is the basic stock for propagated and experimental rabbits and the findings noted have an important bearing on disease and dietary studies. The question arises whether native rabbits have similar habits that might be of great significance in disease transmission and cycles of decimation. An interesting related note on pouching of pellets by banner-tailed kangaroo rats may be consulted in the Journal of Mammalogy, 20(3), August 1939, pp. 378-379.]

Food Habits: Rodents vs. pine seeds

Tinsley, Selden L. Direct seeding--a revival, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(11), Nov. 1939, pp. 888-890.

Editor's abstract: "Since the large scale failure of direct seeding in the early days of forestry in the United States, artificial reforestation has been considered almost entirely in terms of planting. In this article the author protests the abandonment of direct seeding while still in its infancy and presents the results of experiments conducted to determine the factors affecting success and failure in direct seeding."

A good deal of failure of seedings of ponderosa pine is due to rodents but protective methods have some value and should be thoroughly tried out in view of the doubtful economy of raising and planting small trees. Reference is made to destructive activities of Columbian ground squirrels, field mice (Microtus montanus), and chipmunks. Idaho.

Food Habits: Russian olive, Utilization of

Van Dersal, William R. Birds that feed on Russian olive, Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 483-484.

Compilation of records mostly field observations of 9 species, together with a few less definite references. [The plant concerned, Elaeagnus angustifolia, is an introduced one of such wide tolerances that with the care usually extended in cultivation it will grow almost anywhere in the United States.]

Food Habits: Sanderling

Royal, Loyd A. Feeding habits of the sanderling at Copalis Beach, Washington, Murrelet (105 Anderson Hall, University of Washington, Seattle. 50 cents a copy), 20(2), May-August, 1939, p. 25.

Blamed for eating small razor clams the sanderling was proved guilty by the unanimous testimony of 33 stomach contents. Ten had been eating cockles, 9 terrestrial insects, and others gastropod egg cases, mussels, and fish.

Food Habits: Squirrel, Douglas's rod

Adams, Lowell. Sierra chickaree eats young blue-fronted jays, Yosemite Nature Notes (Yosemite National Park, Calif.), 18(8), Aug. 1939, p. 93.

Field observation on Sciurus douglasii albolimbatus.

Food Habits: Squirrel, Gray

Torres, J. Kenneth. Gray squirrel utilization of elm, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 358-359.

Author's abstract: "Record of direct observations of gray squirrels feeding on the flower buds, flowers and samaras of Ulmus fulva and U. americana in spring during the past eight years in Pennsylvania and New York. Ulmus flower buds are taken in large quantities; one squirrel ate an estimated 100. Common usage of elm by gray squirrels in spring, indicates that this tree is an important food producer for them in the localities concerned."

Food Habits: Starling

Lindsey, Alton A. Food of the starling in central New York State, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 176-182, 1 fig., 2 tables.

Report on analyses of 1,268 stomachs, including 149 from nestlings. Author's summary: "It may be stated in summarizing the data on Starling food for central New York State that insects (identifiable at least to order) constitute about 35 percent of the material in adult stomachs, and 77 per cent in nestling stomachs. Vegetable matter makes up 41.4 per cent in adults and 4.9 per cent in nestlings, while mineral items are 0.8 per cent and 2.2 per cent, respectively. The remainder of the food in each case is animal matter other than insects, especially millipedes, unidentified animal matter, and animal garbage. Intensive work in central New York indicates that the economic status

of the Starling, as evidenced by analyses of stomach contents, does not differ fundamentally from that determined by Kalmbach and Gabrielson for six eastern States before this bird had attained its present numbers and distribution. The food habits are on the whole decidedly beneficial, especially in the case of the nestlings."

The author reports on the rate of feeding and growth of 2 broods, one of a single young and the other of 5 nestlings.

Food Habits: Turtle, Snapping

Self, J. Teague. Note on the food habits of Chelydra serpentina, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1938(4), Dec., p. 200.

Two taken near Norman, Oklahoma, had been feeding exclusively upon eggs of frogs.

Food Habits: Vulture, Black

McIlhenny, E. A. Feeding habits of black vulture, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 472-474.

Flocks killing and devouring skunks and opossums; also feeding on cattle dung. Louisiana.

Food Habits: Waterfowl

Munro, J. A. Food of ducks and coots at Swan Lake, British Columbia, Canadian Journ. Research (National Research Council of Canada, Ottawa. 25 cents a copy), 17, pp. 178-186, 4 tables, Aug. 1939.

Tabulation of numbers of 19 species of waterfowl observed on the lake 1932-38; description of lake; report on analyses of stomachs of 59 dabbling and 32 diving ducks, and of 45 coots, tabulated both as to frequency of occurrence and volume of food items. Furnishing cover, building material, and food for birds, mammals, and other organisms, bulrush (Scirpus occidentalis) is the most important plant in the economy of the lake. Chara is the most abundant submerged plant. Author's conclusions: "Observation of waterfowl at Swan lake, British Columbia, during a four-year period, and study of the stomach contents of 136 specimens, indicate that competition for food between ducks and coots during the autumn months is negligible. The branches of Chara form the chief food of coots; the oospores of the alga and to a lesser extent the branches are eaten by some species of duck. As this is the most abundant growth in the lake and is produced in unlimited quantities, there is sufficient for the requirements of a much greater coot and duck population than is ever likely to occur. It is probable that less than one per cent of the Chara crop is consumed by waterfowl. Seeds of Scirpus are most important in frequency of occurrence and percentage volume of duck food. Seeds of other aquatic plants and, to a lesser degree, molluscs and aquatic insects, also are eaten. These foods are inconspicuous items in the diet of coots."

Life Histories: Beaver

Erickson, Arnold B. Beaver populations in Pine County, Minnesota, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 195-201, 1 map.

Studies in St. Croix State Park and adjoining land appeared to warrant, in general, an estimate of 7 beavers per lodge. Beavers were nearly exterminated in Minnesota by 1900 but logging, removing little-used trees and increasing the stands of the much-used aspen, greatly augmented the potential beaver carrying capacity. On 70 percent of the study area, aspen was dominant and the beaver one of the most numerous mammals. The aspen supply is sufficient for maintenance of about the present population of beavers. The number of animals and the quantity of food available are discussed for the principal streams and ponds of the park and vicinity.

Life Histories: Beaver

Shadle, Albert R., and Thomas S. Austin. Fifteen months of beaver work at Allegany State Park, N. Y., Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 299-303, 1 map, 1 table.

Study of the work of introduced animals. Authors' summary: "The first year two adult beavers accomplished the following: (1) Cut 116 trees from 1 to 13 inches in diameter; (2) built two dams, each over 200 feet long and a total of 705 feet of dam; (3) constructed a house with a volume of approximately 472 cubic feet. During the three-month period from August 11 to November 11, 1938, two adult beavers and two kits accomplished the following: (4) Cut 150 additional trees from 1 to 15 inches in diameter, a grand total of 266 trees; (5) besides their other damming operations they built an additional 150 feet of dam and raised the height of the longest dam six inches along its entire length; (6) increased the volume of the house from 472 to 940 cubic feet; (7) collected and stored a winter's supply of branches. The pile measured 50 feet long, 8 feet wide, and 3 to 4 feet deep. Other points of importance were: (8) Ironwood (Carpinus caroliniana) made up nearly 9 percent of the number of trees cut, and Populus 71 percent; (9) the loss from improperly felled trees that lodged in standing trees was only 2.3 percent of all trees cut; (10) the order of preference of trees was: Poplar, willow, shadbush, ironwood, and pin cherry."

Life Histories: Cottontail

Allen, Durward L. Michigan cottontails in winter, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 307-332, 6 pls., tables.

Author's abstract: "A two-year study of the cottontail Sylvilagus floridanus mearnsii) was made on a 500-acre farm in Kalamazoo County, Michigan. In a series of 155 females, taken in December and January, the mean weight was 1,413.24 grams, and 168 males averaged 1,398.21 grams. In the entire series the mean was 1,406.37 ± 9.86. At the end of a severe winter a group of rabbits

averaged 48.8 grams less than a group taken the December before. Older rabbits were distinctly heavier than young of the year. The heaviest animal handled weighed 1,899 grams. The most important woody food plants were dwarf and staghorn sumacs (Rhus copallina and R. typhina), which were used intensively under conditions of deep snow. Upland and lowland brush containing ground holes and stands of artificially planted conifers were important cover types. There was a tendency for more male rabbits than females to be shot in the fall season, leaving a preponderance of females in the residual population. A study of individual ranges indicated that most rabbits occupied from 5 to 10 acres. There was no apparent 'territoriality' in winter. Staphylococcus albus, affecting the eyes, was the most important disease factor. Only 7.1% of a winter population were found to survive to a second winter, and only 2 of 228 animals are known to have survived to a third winter."

Life Histories: Coyote

Young, Stanley P. The coyote marches on, American Forests (919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 45(11), Nov. 1939, pp. 538-540, 574-576, 6 photos, 1 map.

Crafty, cunning, and adaptable, the coyote, despite warfare against it, is holding its own and even extending its range. Formerly the animal was not found in the high ranges on western mountains but it occupies them now. The coyote in some localities has a migratory movement but most of its wanderings appear to be in response to food conditions. Notes are given on extension of range in the Pacific northwest, particularly in Alaska (map) and on sporadic occurrence (due to intentional or unintentional introduction) in the East. Life history, food habits, and economic status are sketched, and range in weight and susceptibility to rabies, mange, and tularemia also are briefly discussed.

Life Histories: Deer, White-tailed

Chapman, Floyd B. The white-tailed deer and its management in southeastern Ohio, Ohio Wildlife Research Sta. (Ohio State University, Columbus), Release 105, 10 pp., 2 figs., 1 table, mimeographed, Sept. 1939.

Deer, almost if not quite extirpated from Ohio by 1904, were reintroduced 1922-30 and have increased so that they now number more than 2,000, distributed in 31 counties. They are most closely related to the Southern white-tail (Odocoileus v. virginianus). The sex ratio is 4.3 does to 1 buck. The paper presents notes on age groups, antler growths and abscission, and mating period. There being no open season, poaching is the greatest cause of losses, with accidents and diseases next in order. The abundance of deer is roughly proportional to the amount of forest cover. Foods are listed and discussed; "the most important winter foods were chestnut-oak acorns, corn, apples, dogwood, hazelnut, mountain laurel, red maple, mountain sumac, blackberry, greenbrier, and orchard grass. Southern Ohio white-tails consume more grass in the spring than at other times. Broomsedge, hazelnut, dogwood, red maple, mountain sumac,

orchard grass, lambsquarter, rye, wild lettuce, bluegrass and the remaining acorns, are among the top-ranking spring foods." Water and salt requirements are commented upon and suggestions for management are given. Bibliography of 9 titles.

Life Histories: Gull, Herring

Dousing, Marl. The herring gulls of Hat Island, Wisconsin, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 170-173, 1 pl., 1 fig., 1 table.

Author's summary: "Among the Herring Gulls of Hat Island there was a definite territorial division of the breeding grounds. The young, at least until they were half-grown, were fed almost exclusively in these territories. The adult gulls were discriminating and fed only their own young. Territorial boundaries were protected by the adults by vigorous fighting. Trespassing young from neighboring territories were frequently killed in this defense of territory by an adult gull. Adult gulls made no attempt to rescue their own young which had strayed out of the home territory and were then attacked by other adults. The food brought in by adults consisted usually of fish but sometimes of quantities of small beetles."

Life Histories: Mole, Brewer's

Eadie, W. Robert. A contribution to the biology of Parascalops breweri, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 150-173, 2 pls., 3 figs., 4 tables.

Report on a 1935-38 study in the vicinity of Durham, N. H., involving about 100 collected specimens. Notes are given on variations in size, dentition, and coloration, scatology, molt, habitats, population, density (1.2 per acre), tunnels, nests, extent of range, periods of activity, locomotion, repair of tunnels, sanitation, social traits, parasites, predators, food (mainly earthworms and insects, the latter chiefly in immature stages), breeding habits, growth, life span (3-4 years), senses, and economic importance. Bibliography of 19 titles.

Life Histories: Mole, Brewer's

Hamilton, W. J., Jr. Activity of Brewer's mole (Parascalops breweri), Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 307-309, 2 figs.

Albany County, New York. The simple field methods used in the study are described. "The records suggest that Parascalops exhibits no rhythmic activity such as is evident in Microtus (Hamilton, 1937) and Peromyscus (Johnson, 1926). This mole appears to be up and about at all hours, but it is apparently more active by day than by night. Probably predation is greatest at night, when the moles leave their burrows to capture the small nocturnal creatures which swarm on the forest floor as darkness falls." Bbiliography of 5 titles.

Life Histories: Pocket gopher

Dice, Lee R. Thomomys the engineer--friend or foe, American Forests (919 Seventeenth St., N.W., Washington, D. C. 35 cents a copy), 45(10), Oct. 1939, p. 512.

Reply to the article by Gabrielson abstracted in WILDLIFE REVIEW, No. 20, May 1939, p. 12. Dice quotes 4 Biological Survey naturalists to the effect that pocket gophers are not serious factors in causing soil erosion, and a former Forest Service man who places the blame for erosion of mountain meadows upon overgrazing. The role of predators in the situation is discussed and the need pointed out of making ecological investigations before control campaigns are adopted.

Life Histories: Prairie chicken, Attwater's

Lehmann, Valgene W. The heath hen of the South, Game, Fish and Oyster Commission (Austin, Texas. 5 cents a copy) Bul. 16, 11 pp., illus., July 1939.

Recognition of the subspecies, statement of its former and present range, tabulation of numbers (8,711) as ascertained in 1937, notes on breeding seasons and behavior, number of eggs (12 on the average), period of incubation (23-24 days), size of broods (average 5.48), juvenile mortality, post-breeding habits, food (about 85 percent vegetable), and limiting factors. The range of this species has shrunk more than 93 percent and the number of birds more than 99 percent in the past 75 years. Destruction of environment has been the most telling adverse factor and the only way of saving the subspecies is by acquisition and management of at least one, and preferably three, refuges each 10,000 acres in size in the best remaining range.

Life Histories: Robin

Schantz, William E. A detailed study of a family of robins, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 157-169, 5 tables.

Author's summary: "(1) The abnormally warm weather of March 1935 started the nesting season earlier than usual. The female selected the sites and built three nests without the aid of the male; (2) incubation began in all nests the evening following the depositing of the second egg and lasted for 12-1/2 to 13 days. The male did not cover the eggs or young at any time nor feed the incubating female; (3) the first egg of the first set was laid at 10:58 A.M., the second between 2 and 2:15 P.M. the following day; (4) one bird gave the food reaction when 6 minutes old; at 2-1/2 hours it peeped incessantly; (5) during incubation the female left the nest from 10 to 19 times a day, averaging 16.3 times. Forty periods on and off the nest averaged 44 minutes on and 11 minutes off (i.e. 80 per cent of daylight hours on the nest); (6) the male could see well in dim light, but the female could not; (7) for the first two days with both broods the young received between 81 and 84 meals per day; the third day they were given 89 and 90 meals, respectively. During the rest of the time the

first brood of 3 young received 82 to 99 meals per day and the second brood with 4 young 92 to 113 meals; (8) the young left when 14 to 16 days old. One could not fly as far as 14 feet, while two flew 20 feet and another 53 feet; (9) one Robin 4 weeks old monopolized the bird bath, threatening adults of 3 species; (10) a nesting female often left her eggs and attacked a neighboring male as he carried food to his young." Columbus, Ohio.

Life Histories: Skunk

Jones, H. Walter, Jr. Winter studies of skunks in Pennsylvania, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 254-256.

In Delaware County the autumn pack population density is 31 per square mile. Family relationships and hibernation is discussed; there is probably no true hibernation in this area.

Life Histories: Sparrow, English

Weaver, Richard L. The northern distribution and status of the English sparrow in Canada, Canadian Field Naturalist (582 Mariposa Ave., Rockliffe Park, Ottawa, Canada. 25 cents a copy), 52(7), Oct. 1939, pp. 95-99, 1 map.

The northern boundary of range (mapped) seems fairly well settled, with only occasional new colonies attempting further extension. Definite migration has been observed at a few points but most movements are more wanderings in response to food conditions. The nesting season runs from mid-April to mid-August. It is generally conceded that numbers are decreasing. Damage is less than in former years and mostly results from competition for nesting sites with swallows and bluebirds.

Life Histories: Sparrow, Henslow's

Hyde, A. Sidney. The life history of Henslow's sparrow, Passerherbulus henslowi (Audubon), University of Michigan, Museum of Zoology (Ann Arbor) Misc. Publ. 41, 72 pp., 4 pls., 3 figs., 2 tables, July 1939.

A standard life history embodying results from personal studies and the literature, covering history of the species, its range, distribution, and migration, details of nesting and other habits, food, enemies, ectoparasites, plumages, and weights. Twelve pages of bibliography.

Life Histories: Squirrels

Zimmerman, F. R. Squirrels need management, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(10), Oct. 1939, pp. 40-45.

Notes on habitat and habits of gray and fox squirrels. Management suggestions are for regulation of lumbering so as to spare numerous food-producing trees, restriction of grazing, and provision of plenty of water.

Life Histories: Tern, Arctic

Pettingill, Olin S., Jr. History of one hundred nests of arctic tern, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 420-428, 2 tables.

Report of a study on Machias Seal Island, Maine, a site free from predators. Production, nevertheless, was kept down (23 fledged young resulting from 144 eggs) largely due to self-limiting factors inherent in the terns themselves. Losses are classified and tabulated and compared with those observed by Hagar in a Massachusetts colony of least terns. Bibliography of 8 titles.

Life Histories: Walrus

Collins, Grenold. Report on Pacific walrus (Odobenus divergens), U. S. Dept. of the Interior, Alaska Game Commission, Biological Survey (Washington, D. C.), 11 pp., mimeographed, Sept. 1939.

An interesting paper dealing with numbers, range, migration, breeding, appearance, weight, habits, and enemies of the walrus; utilization, methods of hunting, and annual kill (2,000 or less by natives) also are treated. Suggestions are given as to management and conservation, with which that made in the opening paragraph, "that the walrus is a very attractive game species from the standpoint of the big game hunter and sportsman," does not seem consistent.

Management: Attracting birds

McKenny, Margaret. Birds in a hedgerow, Bird-Lore (1006 Fifth Ave., New York, N. Y. 50 cents a copy), 41(5), Sept.-Oct. 1939, pp. 289-296, 4 photos.

Fruit-bearing shrubs and the birds they attract, in text and table, based largely on records of the Biological Survey.

Management: Attracting birds

Swigart, Mrs. H. M. How I attract birds to my garden and grounds, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(8), Aug. 1939, pp. 3-6.

Notes on fleshy and other fruit- and seed-bearers, and hummingbird flowers and the use of water, artificial cover, and feeding stations in attracting birds.

Management: Burning

Wahlenberg, W. G., S. W. Greene, and H. R. Reed. Effects of fire and cattle grazing on longleaf pine lands, as studied at McNeill, Mississippi, U. S. Dept. of Agriculture Tech. Bul. 683 (Supt. of Documents, Washington, D. C. 10 cents a copy), 52 pp., 5 pls., 10 figs., 13 tables, June 1939.

References to wildlife are slight but this publication will, nevertheless, be of interest to many wildlife managers not only for the experimental findings reported but also for its review of facts and opinions relative to burning revealed in the literature of which 56 titles are cited.

From authors' summary: "Annual winter burning maintained more favorable composition, quality, and quantity of forage than did exclusion of fire. The smothering due to pine litter and accumulated dead grass retarded the growth of native grasses and legumes and reduced the number of plants per acre. The improvement in forage conditions through burning was reflected in the greater seasonal gains in weight of cattle on the burned area, which averaged 57 percent more than the gains made on the unburned pastures. The cattle secured their advantage in gains during the early part of the grazing season and held this advantage until removed from the area in the fall. The experimental pastures were grazed equally for about 7 months each year over a period of 11 years. Burning and grazing did not result in serious soil degradation. Burned-over soils exhibited slightly favorable chemical characteristics and unfavorable physical characteristics in comparison with unburned soils. The net effect on plant growth of favorable and unfavorable soil changes was not measured. While annual burning improved the forage conditions for cattle, the results indicate that successful regeneration of longleaf pine, especially where the brown spot disease is epidemic, may depend upon some system of periodic controlled burning rather than the extremes of annual fires or fire exclusion, both found unsatisfactory in this study."

Management: Clearing

Ehrhart, E. O. An effective "tree dozer," Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(11), Nov. 1939, pp. 902-904, 5 figs.

Describes and illustrates attachment to bulldozer blade to put pressure on a tree at some height from the ground. Truck trails were built by the aid of this equipment at a cost of $88.72 per mile.

Management: Deer, Mule

Rasmussen, D. I. Utah's mule deer studies and management problems, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 28(5), Sept.-Oct. 1939, pp. 232-240, 6 photos.

In 1938 some 52,000 hunters purchased licenses to hunt deer in Utah, and they bagged from 25,000 to 30,000 bucks. On forest tracts especially studied, 65 percent of the deer hunters were successful. Protection has changed the status of the mule deer from that of a vanishing species in 1915 to one of abundance, including local overpopulations, in 1939. The Utah Wildlife Research Unit was organized to study the deer situation and devise ways of maintaining optimum populations. Its research and extension activities are outlined. Studies of the sex ratio gave results varying from 1:2.5 to 1:3, indicating nothing wrong in this respect. Tagging proved that each deer herd is closely restricted to its range, usually a certain watershed. Competition between

livestock and deer, an important matter in a grazing region, is being carefully studied. It is worse on winter ranges where, however, conditions may be improved by purchase of lands for use of the deer. Feeding is expensive and otherwise undesirable. Winter losses are hardly to be cured by feeding or removal by trapping; herd regulation is a necessity.

Management: Farm game

Anon. A cooperative wildlife management program, Missouri Conservation Commission (Jefferson City, Mo.) Conservation Bul. 6, 20 pp., 1939.

Addressed to potential cooperators, this publication explains the Commission's objectives and outlines the extent of cooperation that body is prepared to offer. The bulletin discusses, also, refuges as part of a wildlife program, limitations of refuges, simple methods of improving environments for wildlife, and problems connected with harvesting the crop, tells how to organize a cooperative wildlife program, how to plan a wildlife management program, and comments on possible improvement in farmer-sportsman relationships. Bibliography of 18 titles.

Management: Farm game

Conklin, J. Gerd., and R. A. McCachren. Special wildlife refuge projects. How they may be established, Pennsylvania Game Commission, (Harrisburg), 12 pp., Aug. 1939.

With accompanying explanatory letter, and application and agreement forms, this pamphlet was prepared in furtherance of the farm game program, the history of which is given. The value of constructive programs for sportsmen's organizations is emphasized; under new legislation (quoted) such groups may now supplement State effort and promote, develop, and maintain refuges on privately owned land wherever the owners are willing. Definitions of terms, suggestions as to procedure, and form of agreement are given. Law enforcement is discussed. The projects are in every way distinct from the State Cooperative Farm-Game units and their success or failure depends upon the attitude and efforts of the sportsmen's groups concerned. The State Game Commission, however, will give aid and advice wherever it can.

Management: Forest wildlife

Buhler, Ernest O. A new way to use a community forest, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(11), Nov. 1939, pp. 901-902.

Multiple use including recreation, part of which is based on a pheasant propagating plant supported by a local sportsmen's organization and county officials. Onondaga County, N. Y.

Management: Forest wildlife

Montgomery, M. E. Forest management on State forests in its relation to wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(8), Nov. 1939, pp. 8-9, 27, 3 photos.

Diversity of groups interested in forests and of their reactions to forestry policies. Foresters have long been interested in game but have done little about it until definitely involved in multiple use programs by employment of CCC and other relief labor. Among modifications for the welfare of wildlife are blocking roads to discourage access to some areas, altering improvement cutting so as to spare food and cover, and building brush piles.

Management: Harvesting big game

Anon. Wyoming game utilization, Wyoming Wild Life (Wyoming Game and Fish Commission, Cheyenne), 4(8), Aug. 1939, pp. 1-2, 18-19, 1 table.

Take of big game discussed and tabulated in connection with estimates of the numbers of elk and deer on national forests for the year 1938. While modifications in hunting regulations had been made in advance to facilitate reduction of some of the well known overpopulations of certain big game ranges in the State, in only one forest did the kill exceed the estimated annual increase. The combined yield of deer and elk for the areas involved was 1.16 per square mile. The dressed weight of the take of these 2 species was more than 2 million pounds, equivalent to a year's consumption of all kinds of meat for the city of Cheyenne. The report notes various details as to distribution of the take, age and weight of the animals, and hunting success. Overpopulation was scarcely remedied and doubling of the kill is recommended.

Management: Harvesting squirrels

Chapman, Floyd D. Controlled squirrel hunting on public lands in Ohio, 1938, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 101, 9 pp., 5 figs., 4 tables, April 1939.

Continuation of a series that has been noticed in previous issues of WILDLIFE REVIEW. This leaflet reports on the abundance of the gray squirrel in southern Ohio, upon ecological factors affecting the species, on hunter success (1.3 squirrels per man), hunting pressure by days, crippling losses, source of hunters (mostly local), and weights of the squirrels (average of 826 in 4 seasons 16.5 ounces). Bibliography of 21 titles.

Management: Herd regulation

Hamerstrom, F. N., Jr., and James Blake. Winter movements and winter foods of white-tailed deer in central Wisconsin, Journ. Mammalogy (Un. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 206-215, 2 figs., 1 table.

Description of the Central Wisconsin Game Project involving a hundred thousand acres, rather poor in both soils and vegetation. Deer number one to about 100-115 acres. Seasonal movements and food habits are discussed with special stress on those of the winter. Factors possibly responsible for concentrations at that time of year are considered. Winter foods are listed by groups according to their degree of utilization. There were some local shortages in food and loss of condition by the deer, but in general the food supply seems adequate to support the present herd. Regulation of the number of animals on certain areas, however, had better be done before trouble develops. Bibliography of 14 titles.

Management: Herd regulation, Kaibab

Johnson, Harlon G. Game management, Arizona Wildlife and Sportsman (125 N. Second Ave., Phoenix, Ariz. 15 cents a copy), 1(8), Aug. 1939, pp. 5, 9.

To maintain the proper numbers of animals, conserve or provide sufficient food and cover, and afford enough protection to bring about the desired balance, the wildlife manager needs much detailed information, most of which must be obtained by local research specifically planned to solve the problems presented. This thesis is illustrated by discussion of the management of Kaibab deer, for details of which see *WILDLIFE REVIEW*, No. 17, December 1938, p. 24. Favorite summer foods of the deer are aspen, snowberry, and rose; and winter preferences, cliffrose, purshia, and Brigham tea.

Management: Inventory

Hicks, Lawrence E. The 1938 September pheasant survey, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 116, 16 pp., 1 fig., tables, Aug. 1939.

Indicated average population in northwest Ohio, 102 birds per square mile. About 20 percent more birds could be seen in the morning than in the evening. Sex ratio of adults 45:55. Highway mortality 5.7 per 1,000 miles. There are remarks also on habitats frequented and difference between the sexes in this respect, on adult-juvenile ratio (about 3:7), proportion of hens rearing young (average 40 percent), age of juvenile birds (average 10.35 weeks), and size of broods (average 7). Notes are given also on rabbits, bob-whites, and Hungarian partridges. Technique of the survey and time required are stated.

Management: Inventory, deer, Michigan

Bartlett, I. H. These controversial deer population figures, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(2), Nov. 1939, pp. 7, 10.

Estimates having proved unsatisfactory, the opportunity furnished by availability of CCC help was utilized to make actual counts on sample areas. Criteria used in selecting the plots, and methods of making the census drives are described. These have been in progress every year since 1935 and have

revealed an average population per square mile of 16.42 deer in the Upper, and 42.40 in the Lower, peninsulas. The total for the State is more than a million animals.

Management: Planting, nuts

Sedam, John. Nut trees a balance to wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(7), Oct. 1939, p. 3, 1 photo.

General article on utilization of nuts by wildlife and on the desirability of planting nut-bearing trees and shrubs.

Management: Planting for wildlife and erosion control

Mussler, Glenn E. Coralberry. Its value in erosion control, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(7), Oct. 1939, p. 5, 2 photos.

This plant which has several uses in erosion control, retains fruit through the winter that is known to be eaten by 9 species of birds.

Management: Refuges

Conklin, W. Gard. The Pymatuning State Game Refuge and Museum, Pennsylvania Game Commission Bul. 19 (Harrisburg, Pa., 10 cents a copy), 52 pp., 4 col. pl. and numerous halftones, 2 maps. Revised June 1939.

Revision of bulletin abstracted in WILDLIFE REVIEW, No. 16, November 1938, p. 30.

Management: Reindeer

Rachford, C. E., Frank H. Reeds, and I. D. Wilson. Report of the investigations of the Alaska Reindeer Committee, etc. Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 76th Congress. First Session. Pt. II. 1939, pp. 571-619 (including discussion). Condensation in Conservation (919 Seventeenth St., N.W., Washington, D. C. 20 cents a copy), 5(4), July-Aug. 1939, pp. 20-23.

A tale of the white man blighting a native culture and belatedly attempting to make amends. "At one time caribou formed an important part of the Eskimo's diet and supplied him with much of his clothing and other needs. With the advent of firearms, the caribou were reduced to the point of extinction and were driven from the area." "Caribou meat ceased to be available about the same time as rifles and harpoons of whalers depleted the seal, whale, and walrus supply to a point where the natives were in danger of starvation." To remedy the situation, reindeer were introduced, 1892-1902, increased, and became indispensable to Eskimo economic life. Again white men intervened (1914) to make money out of reindeer. Herds were greatly increased and much pasturage ruined (reindeer moss requires 25 years to regenerate) but the depression ended

this adventure. Now the proposal is to buy up animals, and corrals and other equipment owned by non-natives, and manage the herds for the benefit of natives, with the hope of permanently improving their economic position. The Committee also recommends establishment of an experiment station to develop facts and technique for proper management of the reindeer. There are about 500,000 of the animals, of which about 320,000 are now owned by natives.

Management: Squirrel box

[Holtzapple, Raymond.] Squirrel box, Pennsylvania Game News, (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(8), November 1939, p. 30.

Drawing of box and suggested measurements. No doubt for gray squirrel; entrance diameter 2-1/2 inches. The box could be improved by binding the entrance hole with tin to protect it from gnawing.

Management: Transplanting beavers

Dahlen, Bernhard C. Beaver in Louisiana, Louisiana Conservation Review (Louisiana Dept. of Conservation, Civil Courts Bldg., New Orleans), Summer 1939, pp. 15-17, 8 photos.

Notes on habits, chiefly quoted, and on a program of live-trapping and transplanting the animals within the State.

Management: Trapping deer

Ruff, Frederick J. Trapping penned deer, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 288-294, 3 figs.

Author's abstract: "Eighteen Virginia white-tailed deer were trapped from a large enclosure by using a remotely controlled solid-walled chute, screened on top, that was about 14 feet long and was equipped at both ends with cloth-covered, hand-operated drop gates reinforced with hog wire. Several of the deer to be caught were carefully herded into this chute and subsequently removed by working them individually, first into a portable, tapered chute, and thence into a crate. The method of capture by patient herding indicates possibilities of trapping wild deer, for the semi-tame animals so caught were apparently little more amenable to driving than are wild deer." Cost very low, $2.63 per head.

Natural History: Alaska

Slattery, Harry. The problem of Alaskan development, U. S. Dept. of the Interior (Washington, D. C.), 94 pp. (mimeographed), July 1939.

Advantages and disadvantages of the Territory discussed. Wolves do not travel in large packs; there is a bounty on the animals of $20 per head, and not one has been killed in the Matanuska Valley in five years (p. 16). Fur-farming is a promising but relatively undeveloped industry (pp. 43, 49-50). Fur

processing could in part be done in Alaska, whereas at present practically all of the fur output, valued at nearly $3,000,000 in 1938, leaves as raw pelts (p. 44). Game as a basis for recreation is mentioned (pp. 45, 46). The bibliography includes 3 titles relating primarily to wildlife.

Natural History: Birds of Dallas County, Texas

Stillwell, Jerry E. Check list of birds of Dallas County, Texas, Dallas Ornithological Society (7460 San Benito Way, Dallas, Texas. $1.00 a copy), 3rd Edition, vii+83 pp., Aug. 1939.

A list of 456 birds of which 339 have actually been observed within the County, annotated, and well coordinated with current literature by the extensive system of footnotes. Bibliography of 39 titles and full index. There are tabular keys to "white herons," "peep sandpipers," gulls, terns, "little olivaceous and other flycatchers," thrushes, "obscure warblers in fall plumage," meadowlarks, and "some adult sparrows."

Natural History: Birds of Grand Canyon

Bailey, Florence M. Among the birds in the Grand Canyon country, National Park Service (Supt. of Documents, Washington, D. C. 30 cents a copy), 211 pp., 124 figs., 1939.

Popular account, with field key, and check list; illustrated and indexed.

Natural History: Birds of prey

Craighead, Frank, Jr., and John J. Craighead. Hawks in the hand. Adventures in photography and falconry. xiii+290 pp., 57 pls., Oct. 1939 (Houghton Mifflin Co., 2 Park St., Boston, Mass. $3.50 a copy).

Record of the experiences of the twin sons of a Department of Agriculture scientist in study and photography of birds of prey and in falconry. The illustrations are excellent and the accounts of birds interesting; the suggestions as to methods of photography will be of use to beginners in that art; those on falconry, it is to be hoped, will instill in recruits to the sport the conservation attitude and love of nature that characterize the authors.

Natural History: Deer

Cahalane, Victor H. Deer of the world, National Geographic Magazine (Hubbard Memorial Hall, Washington, D. C. 50 cents a copy), 76(4), Oct. 1939, pp. 463-510, 2 wash drawings and 16 colored plates by Walter A. Weber, 18 photos.

Popular general account of the family and essays on 25 species giving main points of interest about them; sumptuously illustrated.

Natural History: Frogs and toads

Burt, Charles E. The frogs and toads of the southeastern United States, Trans. Kans. Acad. Sci. (Manhattan, Kans.), 41, 1938, pp. 331-360.

Key and records and some systematic and descriptive notes. Bibliography of 3 pages.

Natural History: Game and fur animals of Alabama

Arant, Frank S. The status of game birds and mammals in Alabama, Alabama Dept. of Conservation (Montgomery), 38 pp., 18 maps, 2 tables, Sept. 1939.

Based mainly on a questionary, this report deals with the present distribution and abundance of 18 species of game and fur animals. One table rates 9 kinds of game according to the head taken and the number of hunters concerned; the bob-white and gray squirrel head the list with no close competitors. The accounts of species, each accompanied by a map showing occurrence and relative abundance, discuss former distribution, habits, economic value, game or fur status, and in some cases management.

Natural History: Herpetology of Kentucky

Welter, Wilfred A., and Katherine Carr. Amphibians and reptiles of northeastern Kentucky, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1939(3), Sept., pp. 128-130.

Notes on 53 species.

Natural History: Herpetology of Oregon

Graf, William, Stanley C. Jewett, Jr., and Kenneth L. Gordon. Records of amphibians and reptiles from Oregon, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1939(2), July, pp. 101-104.

Notes on 35 species.

Natural History: Herpetology of Quebec

Trapido, Harold, and Robert T. Clausen. Amphibians and reptiles of eastern Quebec, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1938(3), Sept., pp. 117-125.

Annotated list of 16 species of amphibians and 5 of reptilians. Bibliography of 20 titles.

Natural History: Mammals, New York

Palmer, E. L., and Edna Drill. Teaching geography through the study of mammal distribution, Cornell Rural School Leaflet (Cornell University, Ithaca, N. Y.), 33(1), Sept. 1939, pp. 4-49, cover design, 29 figs., 25 maps.

Accounts of 32 species, rather detailed as to distribution, but including also notes on appearance, habits, food, and economic value; with numerous illustrations. It is of interest that 18 of the 25 distribution maps show transcontinental range for the species involved. The following figures for take in New York State, recording increase or decrease (in most cases during a ten-year period) are presented.

Take of certain mammals in New York State

Species	1927	1936
Opossum	1,086	2,908
Black bear	122 (1929)	68
Raccoon	40,908	26,921
Mink	9,612	5,608
Otter	1,135 (1928)	163
Skunk	120,002	42,669
Red fox	35,658	10,593
Gray fox	2,338	4,247
Muskrat	553,270	165,825
Cottontail	797,750	597,966

Natural History: Rattlesnakes

Klauber, Laurence M. A statistical study of the rattlesnakes, San Diego Soc. Nat. Hist. (San Diego, Calif.) Occasional Papers 5, 61 pp., 46 figs., 30 tables, Aug. 1939. (Lithoprint)

Part VI of a series of papers on rattlesnakes, this deals almost wholly with the fangs, treating in great detail their structure, growth, replacement, operating mechanism, and their variations as related to taxonomy.

Predators: On ducklings

Munro, J. A. The relation of loons, Holboell's grebes, and coots to duck populations, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 339-344, 2 tables.

The birds named have been charged with predation on ducklings of wild species in British Columbia, but tabulation of many observations on the size of broods reveals no correlation between reproductive success and the presence or absence of any or all of the alleged predators.

Propagation: Bob-white

Lescarbourg, Austin C. American Forests (919 Seventeenth St., N.W., Washington, D. C. 35 cents a copy), 45(11), Nov. 1939, pp. 544-555, 566, 4 photos.

Popular account.

Propagation: Turkey

Barton, O. A. Turkeys. Origin, history, and distribution, North Dakota Agr. College (Fargo) Extension Service Circ. 167, 11 pp., 9 figs., 1 table, May 1939.

Definition and illustration of standard strains; however a good share of the circular is devoted to discussion of the history, distribution, and domestication of the wild turkey.

Propagation: Turkey

Marsden, Stanley J., and J. Holmes Martin. Turkey management, (The Interstate, Danville, Ill. $3.50 a copy), vi+708 pp., 137 figs., 1939.

This book, devoted primarily to the domesticated turkey, contains a chapter (2, pp. 14-24) on the classification, origin, and history of turkeys, much of which relates to wild birds. The wild turkey and its subspecies are further described as to appearance and habits on pp. 46-51. Chapters on propagation, feeds and feeding, and on diseases, parasites, and sanitation also may be of interest to wildlife managers. Specialized bibliographies are incorporated at the end of most of the chapters.

Research: Climbing method

McClure, H. Elliott. A method of tree climbing, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 329-331, 1 fig.

Author's abstract: "The standard method of climbing by tree experts is described. The observer uses a long rope and supports himself by means of a sling made of a double bowline and a sliding knot, the rolling hitch. By this aid he can safely climb about the tree and have his hands free for photography, measuring eggs, banding young, etc."

Research: Hair identification

Dearborn, Ned. Sections aid in identifying hair, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 346-348, 1 fig.

Illustrations of cross sections and medullary structures of guard hairs of 19 species of rodents and insectivores occurring in the northeastern United States, and suggestions as to their use in making identifications.

Research: Live-trapping and marking rabbits

Southern, H. N. A population study of wild rabbits, Quarterly Journ. Universities Federation for Animal Welfare (Gordon House, Gordon Square, London, W.C. 1, England. Sold only to members), July 1939, pp. 4-7.

Describes a method of repeatedly live-trapping European rabbits. The essentials of it are surrounding an infested area with a rabbit-proof fence and maintaining at several outlets tunnel traps functionable in either direction. The animals were marked with ear tags, the numbers on which can be read by the aid of a telescope of a power convenient in making other observations on the animals. The opening and closing paragraphs of the article contain reflections that can well be taken to heart on this side of the Atlantic.

"Of all the animals inhabiting the British Isles comparatively little is known of the mammals. This is especially remarkable in respect of the rabbit, since its ubiquity and powers of destruction make it so commonly talked about, and yet concerning its habits there exists a large body of ideas but very few supporting data."

"In conclusion the fact may be emphasized that we live among animals the whole of our lives, we affect their lives to a varying extent, we use them for our own purposes, even arrogate to ourselves the right to kill them, sometimes by not very humane methods, and at the same time we are appallingly ignorant of the very simplest facts about them, which should leave us very little cause for pride."

Research: Sexing sharp-tailed grouse

Manweiler, J. Combined weight class--rectrix pattern method for determining sex of sharp-tailed grouse, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 283-287, 1 fig., 1 table.

Author's abstract: "To eliminate the approximately 15 percent error resulting in sexing sharp-tailed grouse by the rectrix pattern, a weight-class table, representing 1,304 birds, is presented to determine the probable ratio of males to females by weights alone. A combination of both methods eliminates most possibilities of error. During periods of inclement weather, best exemplified by low temperatures, a compensatory weight adjustment is advisable. The paper applies to the Great Plains sharp-tailed grouse of the Lake States region."

Research: Trapping lizards

Rodgers, Thomas L. A lizard live trap, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1939(1), March, p. 51, 1 fig.

Of pitfall type; used with or without bait averaged one lizard a day.

Weights: Bear, Black

Gerstell, Richard. The growth and size of Pennsylvania black bears, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(8), Nov. 1939, pp. 4-7, 4 photos, 1 graph, 3 tables.

Notes on breeding season and gestation period and records of weights of cubs and adults. Fifty daily weighings of cubs reared in captivity and of the food they consumed are summarized and graphed. A table presents estimated range of weights for black bears from 10 to 70 months of age (extremes 30-80 and 255-350 lbs.). Heaviest Pennsylvania bear known weighed 633 pounds.

Weights: Deer, White-tailed

Hopkins, Ralph. Wisconsin's large deer of 1938, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(10), Oct. 1939, pp. 49-51, 1 photo, 3 tables.

Dressed weights indicating live weights in a few cases of more than 400 pounds. There is a table of average weights of deer of various age classes killed on national forests, and another of measurements of record heads.

ADDENDA

Classification: Rat, Kangaroo

Hall, E. Raymond, and Frederick H. Dale. Occasional Papers, Mus. Zool., Louisiana State University (University, La.), 4, 63 pp., 3 figs., 1 table, Nov. 1939.

General discussion of *Dipodomys microps*; citation of type, statement of range, diagnosis, comparisons, remarks, and list of specimens examined for 11 subspecies, 3 of which are described as new.

Diseases and Parasites: Chuckwalla

Conti, L. F., and J. H. Crowley. A new bacterial species isolated from the chuckwalla (*Sauromalus varius*), Journ. Bacteriology (Williams & Wilkins Co., Baltimore, Md.), 37(6), June 1939, pp. 647-653, 3 figs.

Authors' summary: "A new bacterium has been studied which is associated with a chronic disease in *Sauromalus varius*, characterized by tumor-like lesions of a rather slow evolution. The organism is a chromogenic, gram-negative, non-spore-forming, motile rod which has been temporarily classified as *Bacterium sauromali*."

Diseases and Parasites: Erysipelothrix

Waller, E. F. Erysipelothrix infection in a quail, Journ. Amer. Veterinary Med. Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 95(751), Oct. 1939, pp. 512-513.

Review of literature of which 7 titles are cited. Identification of the disease from a game farm quail in Iowa. Description of lesions and of laboratory procedure in determining the organism as Erysipelothrix rhusiopathiae. It is infectious to a variety of birds and also to domestic animals and man.

Diseases and Parasites: Thallitoxicosis

Larson, Charles P., Wm. N. Koller, and J. D. Manges. Accidental canine thallotoxicosis and dangers of thallium used as a rodenticidal agent, Journ. Amer. Veterinary Med. Assoc. (221 No. La Salle St., Chicago, Ill. 75 cents a copy), 95(751), Oct. 1939, pp. 486-489, 2 figs.

Depilatory and toxic effects, minimum lethal dose (15-25 mg. per kg. of body weight), symptoms of the poisoning in animals and man. Despite precautions, use of thallium in rat control at the Western State Hospital, Fort Steilacoom, Washington, resulted in the death of "the majority of the pets on the hospital grounds." Case reports are given for 2 dogs. The authors conclude that "The use of thallium as a rodenticidal agent, even in the hands of an expert, is an extremely dangerous procedure, as it endangers both pets and children." Bibliography of 9 titles.

Diseases and Parasites: Ulcerative enteritis

Bass, Charles C. Observations on the specific cause and the nature of "quail disease" or ulcerative enteritis in quail, Maryland Conservationist (512 Munsey Bldg., Baltimore, Md.), Fall 1939, pp. 26-27.

Lists 10 species of gallinaceous birds in which the disease has been observed. Both the macro- and micro-scopic appearances of lesions are described. Technique for demonstrating a gram-negative, anaerobic bacillus abundant in the lesions. The author has transmitted the disease by 4 methods, one of which is use of pure cultures of the organism mentioned. Massive infections produced death in periods as short as 36 hours. On the other hand some infections may last for months, producing "carriers" that may give the disease to other birds. The suggestion is made that the infection may be transmitted through eggs.

Life Histories: Opossum

Coghill, G. E. Studies on rearing the opossum (Didolphys virginiana), Ohio Journ. Sci. (Bernard S. Meyer, Ohio State University, Columbus. 50 cents a copy), 39(5), Sept. 1939, pp. 239-249, 11 photos.

Description of pens and other equipment, and notes on appearance and behavior, especially of the very young. Bibliography of 9 titles.

Life Histories: Thrush, Song

Siivonen, Lauri. Zur Ökologie und Verbreitung der Singdrossel (Turdus oricetorum philomelos Brehm), Ann. Zool. Soc. Zool.-Bot. Fennicae Vanamo, 7(1), ix+ 235 pp., 42 figs., 10 maps, 24 tables, (Summary in Finnish, pp. 286-289), 1939.

A comprehensive, thoroughly organized, and well-documented report on a 1934-39 study of the ecology of the song thrush. Breeding and wintering ranges and migrations are discussed and mapped. In recent years the species has extended its nesting range northward and has remained in winter in areas previously unoccupied at that season. These phenomena are in accord with observed improvement in the north European climate. The breeding range lies mostly in pine- and spruce-clad regions but takes in some broad-leaved forests. It almost completely incloses the ranges of Picea excelsa, P. omorica, and P. orientalis and is well correlated also with the distribution of certain herbs. Abundance of the birds and size of their breeding territories varies greatly with the type of environment. Open spruce forests and mixed woods rich in spruces are most favorable, supporting up to 15-20 (and locally even 50) pairs per square kilometer (247.1 acres). Other environments, including areas modified by man, are described and rated.

The song thrush invariably has a definite breeding territory in which representatives of other species, even of thrushes but not of its own kind, are tolerated. The nest usually is in a dense spruce and the materials locally gathered often camouflage it effectively. Its height from the ground is mostly from 1-3 meters (highest 12 m.) and it is most frequently placed against a trunk or among thick branches where it is protected from rain. It is also well shaded, the average site being only about a third as well lighted as those chosen by the missel thrush. Materials and construction of the nest are described and illustrated. Variation in the number of eggs is thoroughly discussed, but little correlation with environmental factors is disclosed; the number of broods, however, increases from north to south. Incubation usually lasts 12-14 and brooding 13-14 days. Nest destruction varies with locality, being highest in the vicinity of man's dwellings; destroyers of eggs or nestlings include members of the crow family, especially jays and magpies, and in addition martens, weasels, dormice, snakes, ants, cats, and boys. The bird's songs are classified into five types that are discussed as affected by territory, breeding cycle, weather, intensity of light, and length of day.

In a section on nutritional biology, the author reviews the methods that have been used in studying and recording the food habits of birds and points out the desirability of making simultaneous investigations of available foods. He summarizes numerous earlier studies of the dietary of the song thrush and details the findings of his own researches, including both stomach analyses and field observations. The species consumes more animal food in the southern parts of its range and more wild fruits toward the north. Earthworms, snails, slugs, beetles, caterpillars, and ants are principal items of the animal diet, and fruits of Vaccinium, Ribes, Empetrum, Sorbus, and Juniperus leading articles in the vegetable subsistence. The food environment and feeding habits receive special attention, an interesting feature of behavior being the breaking of snails upon rocks that are habitually resorted to, the fragments of shells about these "anvils" conveniently indicating the bird's molluscan diet. The author inventoried available foods of sizes suitable for the song thrush in different types of environment at various seasons for the purpose of appraising utilization in relation to availability. But first he interposes results of a study of food preferences with caged thrushes from which he derives standards for an optimum diet. However the song thrush will substitute for the most relished foods others less preferred, especially when these are abundant and

readily obtainable. In other words, while the species has marked food preferences, they may be fully expressed only in the presence of all optimal foods. Preferences can be followed in many environments only so far as permitted by available supplies of which abundant sorts are likely to be most freely utilized. From his study of diet in relation to the kinds of food present, he concludes that both regional and seasonal variations in utilization of food are in direct correlation with variations in the available supply. This is an interesting confirmation of the importance of availability (cf. Smithsonian Misc. Coll. 85(7), 1932, pp. 135-136) but the intercalation of a theoretical optimum based on study of caged birds seems to add no strength to the hypothesis (cf. Proc. Acad. Nat. Sci. Philadelphia, 1912, pp. 356-364).

The author's term "optimal value of foods" appears to be only another way of expressing the familiar facts that birds are limited in their diets by their ecological ranges, by their sizes and capacities, and by their constitutional adaptations for collecting and utilizing certain types of food. Restricted by these dominating conditions, each kind of bird, as a rule, feeds in a more or less specific way in a limited environment, where in all likelihood the most plentiful edibles will be most freely consumed. This is the natural and practical thing, hence the rule. The bird may have preferences, but in the long run it is compelled by sheer pressure of circumstances to feed on available foods more or less in proportion to their abundance. The density of the song thrush population often seems to be in proportion to that of certain foods, as beetles, mollusks, and bilberries, but this principle does not operate to make the species as common in mature open deciduous woods, for instance, as it is in denser spruce forests, although the food supply may be equally great. The song thrush sometimes gets almost all of its food in a quite restricted part of its nesting territory, hence the author does not agree with Howard that quantity of food is decisive in fixing size of territory.

Concluding sections of the paper comprise a chapter on general behavior, a summary, and a 16-page bibliography.

WILDLIFE RESEARCH AND MANAGEMENT LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of the Interior, Washington, D. C.

BS-141. Protecting blueberries from damage by herring gulls, by Robert C. McClanahan, 4 pp., August 1939.

Habits of the gulls in Washington and Hancock Counties, Maine; damage to blueberries is restricted to a small minority of the gull population; control by frightening devices and modification of cultural practices.

BS-142. Big-game inventory of the United States, 11 pp., 17 tables, August 1939.

Second inventory based largely on estimates yet "far from satisfactory." In time trends may be reliably indicated. Notes on deer overpopulations, and

increase in their species in general as well as that of antelopes and black bears. Mountain sheep still decreasing. Tabulation of the estimates of 15 groups by States and according to land ownership and control. Also totals by States; grand total nearly 6 millions.

BS-143. Suggestions for the control of vagrant domestic pigeons, 4 pp., August 1939.

Status of pigeons as bearing on the legality of aggressive actions against them; suggestions for control by excluding, frightening, trapping, shooting, poisoning, and gassing.

BS-144. Raising deer in captivity, 6 pp., August 1939.

Enclosures and food requirements; notes on characteristics of white-tailed, mule, and black-tailed deer; list of valuable food plants; bibliography of 27 titles.

BS-145. Birdbanding, by Frederick C. Lincoln, 5 pp., October 1939.

Supersedes Leaflet BS-53 (1936). Notes on the history of birdbanding; organization in this country; qualifications of cooperators; suggestions as to avoiding injury to birds. description of bands and traps; and summary as to value of the work.

BIOLOGICAL BIBLIOGRAPHIES

Sporting magazines and conservation department organs

[Supplement; previous installments in WILDLIFE REVIEW No. 3, pp. 32-34, No. 4, p. 27, No. 7, pp. 30-31, and No. 12, p. 42.]

Of general scope

Ducks Unlimited. Quarterly, no price quoted. 500 Fifth Ave., New York, N. Y.

Fish & Game News Bulletin. Monthly, 75 cents a year. New Brunswick Fish and Game Protective Assoc., Fredericton, N. B., Canada.

The Sportsman. Monthly, no price quoted. 1134 H St., Fresno, Calif.

Of local scope

Arizona Wildlife and Sportsman. Monthly, $1.50 annually. Arizona Game Protective Assoc., 125 North Second Ave., Phoenix, Ariz.

Delaware Game and Fish News. Monthly, no price quoted. Board of Game and Fish Commissioners, Dover, Del.

Kansas Fish and Game. Monthly (mimeographed). Forestry Fish & Game Commission, Pratt, Kans.

Massachusetts Conservation Bulletin. Quarterly, no price quoted. Department of Conservation, Boston, Mass.

Bulletin of Massachusetts Fish & Game Association. Museum of Comparative Zoology, Cambridge, Mass.

Michigan Game Trails. Bi-weekly, 5 cents a copy. 214 Humber Bldg., Highland Park, Mich.

Minnesota Sportsman. Monthly, no price quoted. 1301 5th St. N. E., Minneapolis, Minn.

Mississippi Game and Fish. Monthly, no price quoted. Mississippi Game and Fish Commission, Jackson, Miss.

The Missouri Conservationist. Quarterly, no price quoted. Missouri Conservation Commission, Jefferson City, Mo.

Missouri Wildlife. Monthly, 10 cents a copy. 3832 Charlotte St., Kansas City, Mo.

National Wildlife Federation Bulletin. Monthly, no price quoted. National Wildlife Federation, Investment Bldg., Washington, D. C.

The Northwest Conservationist. Quarterly, 15 cents a copy. 6224 25th Ave. N.E., Seattle, Wash.

Outdoor Iowa. Monthly (mimeographed). State Conservation Commission, Des Moines, Iowa.

Rocky Mountain Sportsman. Monthly, 15 cents a copy. Denver National Bldg., Denver, Colo.

Snohomish County Sportsman, Sulton, Wash.

Southwestern Sports Magazine. Monthly, 15 cents a copy. 214 North 6th St., Waco, Texas.

American periodicals relating to birds and mammals

[Supplement; previous installment in WILDLIFE REVIEW No. 4, pp. 27-29.]

Birds

Bird News. Monthly, $1.00 a year. L. R. Talbot, Old Concord Road, South Lincoln, Mass.

The Chat. Semi-monthly (mimeographed), single copy 25 cents. John H. Grey, Jr., 1719 Park Drive, Raleigh, N. C.

The Journal of Minnesota Ornithology. Annually, 10 cents a copy. The T. S. Roberts Ornithology Club, St. Cloud, Minn.

Bird Banding

Ebba Nus. Mimeographed. William Pepper, Jr., 110 Glenview Ave., Wyncote, Pa.

Biological journals

[Supplement; previous installment in WILDLIFE REVIEW No. 8, pp, 33-35.]

Of general scope

The American Journal of Pathology. Bi-monthly, $8.00 a year. 318 Harrison Ave., Boston, Mass.

American Journal of Physical Anthropology. Quarterly, $6.00 a year. Wistar Institute of Anatomy and Biology, Woodland Ave. and Thirty-sixth St., Philadelphia, Pa.

The Journal of Comparative Neurology. Bi-monthly, $7.50 a year. Wistar Institute of Anatomy and Biology, Woodland Ave. and Thirty-sixth St., Philadelphia, Pa.

The Journal of Nutrition. Monthly, $5.00 a year. Wistar Institute of Anatomy and Biology, Woodland Ave. and Thirty-sixth St., Philadelphia, Pa.

Physiological Zoology. Quarterly, $7.50 a year, single copy $2.25. The University of Chicago Press, 5750 Ellis Ave., Chicago, Ill.

Of local scope

New England Naturalist. Quarterly, 25 cents a copy. 234 Berkeley St., Boston, Mass.

Institutional and societal publications, excluding those of Academies of Science

[Supplement; previous installment in WILDLIFE REVIEW No. 8, pp. 36-37.]

University of Arizona Biological Science Bulletin. Semi-quarterly, no price quoted. Tucson, Ariz.

University of California Publications in Zoology. Issued irregularly, parts variously priced. University of California Press, Berkeley, Calif.

Bulletin Natural History Survey. Issued irregularly, no price quoted. Urbana, Ill.

Indiana University Publications Science Series. Issued irregularly, no price quoted. Bloomington, Ind.

Iowa State College of Agriculture and Mechanic Arts Research Bulletin. Issued irregularly, no price quoted. Ames, Iowa.

University of Iowa Studies. Semi-monthly, no price quoted. Iowa City, Iowa.

Kansas University Science Bulletin. Semi-monthly from January to June and monthly from July to December, no price quoted. University of Kansas, Lawrence, Kans.

University of Michigan School of Forestry and Conservation Bulletin. Issued irregularly, single copies variously priced. Ann Arbor, Mich.

Publications of the University of Oklahoma Biological Survey. Quarterly, parts variously priced. University of Oklahoma Press, Norman, Okla.

Roosevelt Wild Life Annals. Quarterly, $5.00 a year, single copy $1.25. New York State College of Forestry, Syracuse, N. Y.

Roosevelt Wild Life Bulletin. Quarterly, $4.00 a year, single copy $1.00. New York State College of Forestry, Syracuse, N. Y.

NOTES AND NEWS

Federal Aid to the States in Wildlife Restoration.--From July 1 to October 21, 63 projects in 30 States were approved by the Biological Survey, 23 of them involving research, 25 being for development, and 15 for acquisition of game management areas.

Aleutian Islands Wildlife Refuge.--Based on field investigations in recent years on this 1,000-mile stretch of islands totaling 3,000,000 acres in area, comprehensive regulations have been issued by the Secretary of the Department of the Interior to control the blue fox industry and destruction by the foxes of colonial birds of the islands, to protect the fauna in general, and to provide economic independence for the native Aleuts. Enforcement of the regulations will be entrusted to the crew of the Brown Bear, a patrol boat adequate for continuous service in the difficult seas of the regio. .

The National Park Service is preparing a multilithed bulletin on the basis of the 1939 wildlife census in national parks and monuments. The bulletin will give brief accounts of conditions in all major parks and monuments, statistics on birds and mammals, and a discussion of the bear-visitor problem. Copies may be obtained by writing to the Wildlife Division, National Park Service, Department of the Interior, Washington, D. C.

It should perhaps be explained that the comment at the top of page 28, No. 22 of WILDLIFE REVIEW, was in criticism only of a popularized account of the 10-year quail study in Columbia Co. (Prairie du Sac), Wisconsin. Errington, himself, has long recognized a connection between his findings and the older thesis of proportional predation (Ecology, 15:110-127, 1934; Condor, 37:230-232, 1935); the chief differences he points out relate to thresholds of comparative security of wintering bob-whites from, and vulnerability of overpopulations to, predation in north-central States.

"Abstracts of papers presented at Wildlife Conservation Short Course. May 4, 5, 6, 1939" (University of Minnesota, Dept. of Agriculture, 54 pp., mimeographed). Obtainable, so long as the supply lasts, from Prof. Gustav Swanson, University Farm, St. Paul, Minn.

The nature of the sections relating to wildlife (other than fishes) is here briefly indicated.

Anon. "The wildlife program of the U. S. Soil Conservation Service," pp. 1-4.
Use of vegetation suitable for erosion control in ways that will benefit wildlife particularly on the so-called waste areas on farms.

Fenstermacher, R. "Diseases affecting moose," pp. 5-6.
Caused by ticks, eyeworms, lungworms, flukes, tapeworms, roundworms, and the bacterium Brucella.

Green, R. G. "Diseases of wild animals and birds," pp. 7-8.
Possibilities of combating lead poisoning by the use of shot made from a readily disintegrable alloy. Even if knowledge of wildlife maladies, as the shock disease of the snowshoe hare, does not promise control, yet it may lead to improved management of the animals. Understanding wildlife diseases transmissible to man, as tularemia, is necessary in safeguarding human health. Pseudotuberculosis in various animals and distemper in foxes also are mentioned.

Gillham, C. E. "Waterfowl problems in Minnesota," pp. 9-10.
The need still is for waterfowl to populate northern breeding grounds. Refuge areas are being planted but in time they would develop suitable vegetation by natural processes. While we must go ahead as best we can in practical ways, research in every direction is needed.

Frodine, Gordon. "Farmer-sportsman relationships," pp. 11-14.
Minnesota has a rich and varied stock of game and much public land open to hunting. The number of hunters is growing, however, and cannot be fully accommodated by public shooting grounds. Farmers not originally opposed to hunting on their lands become so due to trespass nuisances. "No hunting" signs are most numerous near centers of population. Outline of methods of harmonizing farmer-sportsman relationships that have been effective in Michigan, Ohio, and other States.

Aldous, Shaler E. "Minnesota big game animals," pp. 15-18.
Minnesota's original 10 big game species have now been reduced to 5, two of which also have been nearly or quite extirpated and then reintroduced. Brief history of each of the species with comment on the existing population, if any. White-tailed deer numbered about 335,000 in 1937 and were worth at least $10 each. The herd could withstand a harvest of 25,000 to 30,000 animals per year, yielding nearly a 10 percent return on the "capital" value.

Anderson, Parker O. "Planting trees and shrubs on farms for wild life," pp. 19-22.

General suggestions relative to planting; lists of cover, browse, mast, fruit, and seed producers; and notes on kinds of wildlife utilizing numerous trees and shrubs.

Elkins, Winston A. "The deer problem in the national forests," pp. 23-25.
The deer population should be held at about the carrying capacity of the range, regulated hunting being the most obvious means. Some areas are too inaccessible for hunting to be an important factor and there predators can be beneficial. Permitting overpopulation, starvation, and destruction of range is wasteful mismanagement. Live-trapping, too expensive for general use, is applicable in special cases. With the population at a reasonable level, habitat improvement, especially of winter range, may be attempted. New winter yards can be created although at considerable expense.

Roberts, Thomas S. "The value of song birds," pp. 34-35.
About a billion birds make their homes in, or visit, Minnesota each year. They have great importance for good or harm; illustrations of both tendencies are cited.

Breckenridge, W. J. "Reptiles and amphibians of Minnesota," pp. 36-40.
Comment on superstitions relative to these animals. Characteristics and habits of the groups and summary of Minnesota representations of them.

Swanson, Gustav. "Upland game birds," pp. 41-44.
Comment on about a dozen species, 3 introduced, of which the pheasant is now the most important game bird of the State. Factors which are responsible for the supremacy of the pheasant include: High rate of reproduction, marked resistance to unfavorable elements of the environment, polygamy, ability to escape hunters, and adaptability to artificial propagation.

Manweiler, J. "Minnesota fur-bearers and problems of using them properly," pp. 49-54.
Definitions of "fur-bearers," and of "wildlife management." This is an industry that should be carried on like farming but which can utilize marginal lands. Sound management requires inventory, census, and control of populations. The history of fur-bearers has been one of constant decline in numbers. Minnesota fur animals comprise 22 species, of which the beaver, marten, fisher, and otter have had legal protection in recent years. Estimated numbers and values by species for the period 1930-37 are presented in a table. Harvest is not properly regulated but suggestions are given, particularly with reference to beavers.

"Now legislation enacted this year provides that in the future Wisconsin will pay for damage done by bears as well as deer. The legislation follows many claims during the last few years as to bear damage to beehives, sheep, calves, and pigs. The problem of bear damage is also a serious question in the neighboring State of Michigan. A recent statement by the Michigan Conservation Department says: 'The legislature in its recent session, eyeing bills for bear damage totalling more than $5,000, approved payment but voted to remove the animals from the protected list. The legislature qualified its action, however, in authorizing the commission to restore protection to bears in any county.'" (Wisconsin Conservation Bulletin, 4(10), Oct. 1939, p. 15.)

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